School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

vol. III no. 8

April, 1944

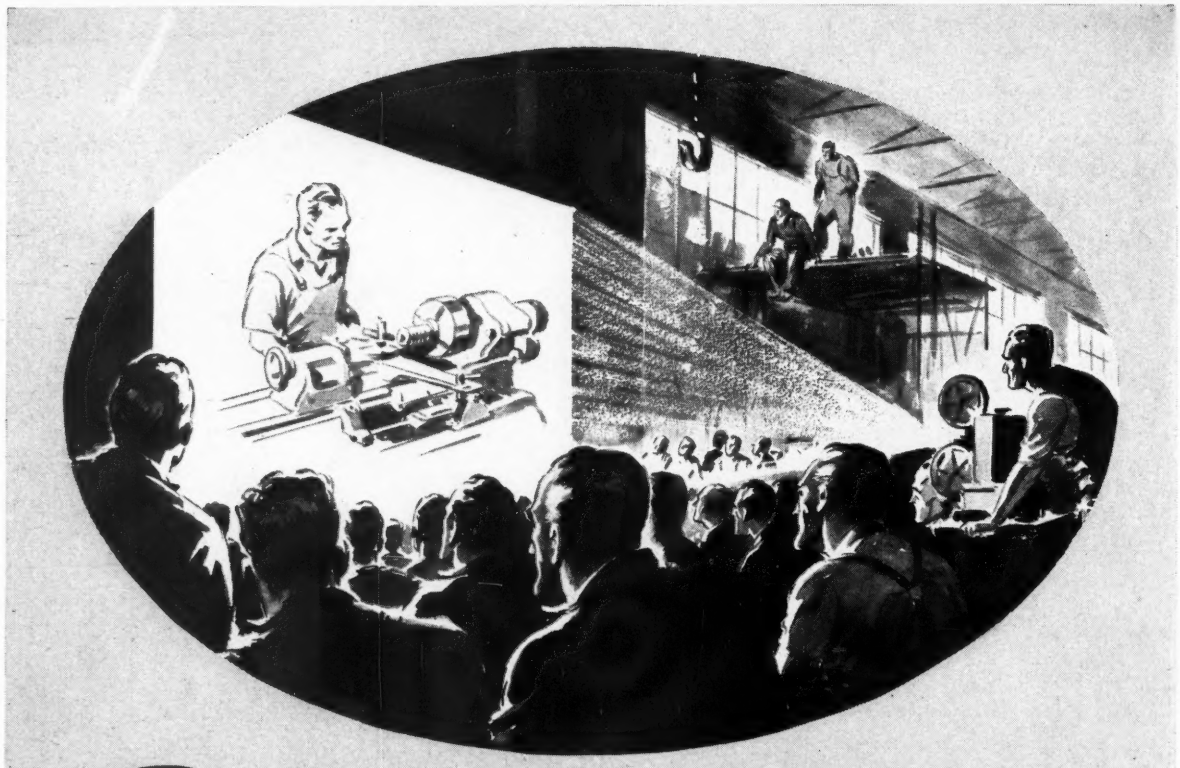
Correlating Shopwork with Other Subjects
by Lester C. Smith

Angle Grinding Wheel Dresser
by Jon P. Adams and M. B. Goodwin

A Short Course in Pencil Rendering
by Howard W. Boekeloo

General Shop for Girls
by Percy H. Heron

News from Industry ● from Washington ● Instructional Resources ● Strictly Personal



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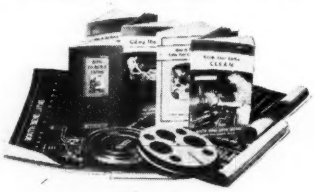

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The Cover . . . . .

Girls in the San Diego, California, High School are given a course in general shop which consists of five-week periods spent in each of four areas of shopwork. The one-semester course gives these young women a much better notion of industrial operations than they otherwise would have. The girls on the cover are working in the machine shop at San Diego. The picture is a San Diego Schools photograph. See article on page 32.

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School Shop

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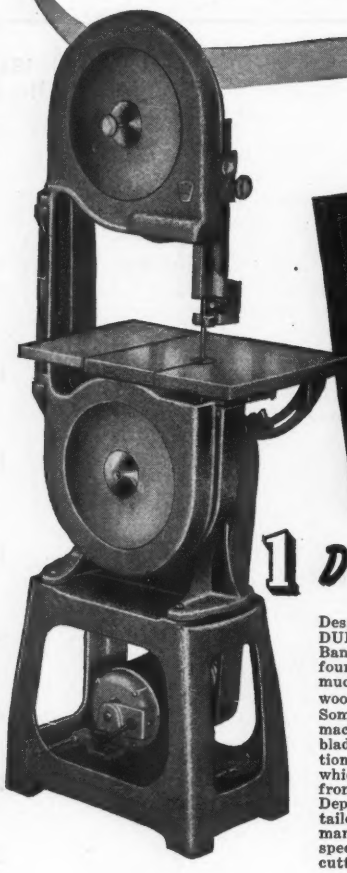

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Correlating Shopwork with Other Subjects

BY *Lester C. Smith*

The author, who is teacher of industrial arts in the Laboratory Schools of the University of Chicago, gives herein specific ways in which shopwork can be correlated with other subjects in the curriculum so that learning can be fun and subject matter can be given meaning. Evidence is shown of cooperation among teachers to an unusual degree.

TWENTY-FIVE years ago, in the dark ages of manual training, the writer first experimented with various schemes and methods of correlating and integrating shopwork with other school subjects. He was convinced then, and is even more firmly convinced now, that doing things with one's hands is a practical test of one's knowledge.

This is not always true, of course, nor is it necessary that a test, in order to be a good measuring instrument, appraise one's practical skill. For instance, one can recognize, enjoy, and appreciate a classical composition in music and even know the principles of good composition without being able either to compose a piece of music or to play a musical instrument. One can also recognize a masterpiece in art, literature, drama, architecture, or weaving without being able to paint, write, design, or weave. However, the person who has skill in painting, writing, designing, or weaving can *better* appreciate the fine painting, poem, building, or rug than can the unskilled person. For the purposes of cultivating appreciation and of testing knowledge, the teachers in the elementary-school grades of the Laboratory Schools of the University of Chicago correlate, whenever practical, the industrial-arts program with that of other subject fields.

There is no regular printed course of study or activity for the industrial-arts program, as this program varies from day to day, month to month, and from year to year. However, the pupils are taught by the end of Grade VI to use, in a correct manner and with some skill, most of the simple tools needed in woodworking leather, plastics, art metal, weaving, and clay modeling. They also use such power machines as the jig saw, sander, drill press, band saw, jointer, and wood lathe. Instruction in the use of machines is given by class and group demonstrations, followed by individual teaching as needed. Since each class includes from 12 to 18 pupils, ample time is available for a great deal of individual help.

At the present time the work in the shop laboratory is correlated with science, art, social studies, dramatics and assemblies, Christmas activities, mathematics, and the home. Some typical activities are described in the following paragraphs with several of them outlined in some detail.

Correlation with Science

Each science class in Grades IV, V, and VI has at least one period a week in the shop laboratory. Usually the science teacher accompanies the class. In this way the teacher can check the pupils' knowledge and correct false ideas or impressions. Each pupil first plans with the science teacher the project that he wishes to undertake and shows what he expects to demonstrate. His plan is then checked by the shop instructor to determine whether materials are available and whether the project is practical from the standpoint of construction. These projects may be taken individually or in groups. A typical plan is shown below.

Project.—Making a question-and-answer board
Object or principle.—To show typical correct electrical wiring
Materials required.—
1 piece of ¼" plywood 9" x 12"
1 piece of pine ¾" x 2" x 9"
20—½" bolts, ½" long
6' of bell wire
1 small storage cell
1 small light bulb
4—1" flat-headed nails
Tools needed.—Saw, plane, drill, hammer, screw driver, pliers, soldering iron, and solder.

The proposal for a project also includes a working diagram for the construction of the board, as shown in Figure 1.

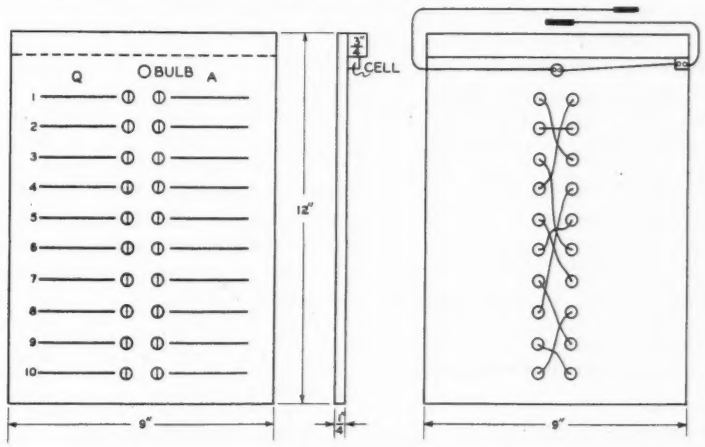
When the plan has received the approval of both the science teacher and the shop teacher, the pupil is supplied with the materials and is ready for work. The plywood is sawed to size and smoothed. Holes are drilled, and the top piece is nailed on. The bolts are inserted; the wiring is done; the cell and the bulb are fastened in place; questions and answers are put in place (usually on separate pieces of paper so they can be changed); and the board is completed and ready for a test. Now is the big moment—will it work? If it does, the pupil proudly demonstrates his handiwork to pupils and teachers. If it does not, he must find and correct his mistakes. Science books are available in the shop. After the construction is satisfactorily completed, the pupil may finish his board with shellac or decorate it as he desires.

Making these boards has been a popular project and pupils have worked out some very original schemes. By completing some such project, a pupil gains a much more exact knowledge of an electric circuit than he would from reading books on the subject and studying diagrams—and he has *fun.*

Some of the other science projects which have been completed are listed below.

A. Study of air
   Windmill
   Parachute
   Glider
   Airplane
   Kite
B. Study of machines
   Pry bar, levers, roller
   Cart—introducing two wheels
   Wagon—introducing four wheels and steering apparatus
   Boats—barge, paddle-wheel, steam, electric
   Turbine—steam and water

Figure 1.—Working drawing for construction and wiring of a question-and-answer board.



Inclined plane and pulleys
Catapult
Pendulum

C. Study of gravity
Balancing toy made with clothespins
Scales
Teeterboard
Yo-yo

D. Study of light
Periscopes of various sizes, shapes, and kinds
Sun dial
Lens holder
Microscope

E. Study of electricity
Buzzer, telegraph key, switch
Motor
Question-and-answer game
Doorbell—splicing and soldering wire
Crystal detector, electromagnet
Transformer, coils, fuse box
Lamp cord—underwriter's knot
Repair flashlight
Toy train system

F. Study of sound
Xylophone—wood, metal
Other musical instruments

G. Miscellaneous
Display boxes for rock collections
Mounting of seed collections
Butterfly nets, mounting board, etc.
Bird house and feeder

Correlation with Art

Since the art studio and shop laboratory adjoin, it is easy for pupils to go from one to the other. An article may be designed in the art room and be made in the shop; the finish and decorations may be planned in the art room and the actual painting be done in the shop. Either of the teachers is always ready to help a pupil from the other room.

A girl, for example, wanted to make her father a stationery-holder for his desk. She measured his envelopes and found that the holder must be 6½″ long, 4″ high, and 3½″ wide. Following her working drawing would have resulted merely in a boxlike structure with an open top. She took the dimensions and sketch to the teacher of art and returned to the shop with a plan for a very artistic holder, well designed and attractively decorated with figures of Dutch children. She made the stationery-holder in the shop, went to the art room and painted it with show-card colors, and then returned to the shop to finish the holder with a coat of clear shellac.

Other art objects which have been made in the shop are listed below.

Toys on wheels—animals, soldiers, figures, trains, carts, wagons
Napkin rings, curtain pulls
Boxes to decorate
Lawn figures—birds, plant sticks
Coasters, plaques
Scrapbooks, notebook covers, guestbooks, photograph books
Picture frames
Leather purses, belts, bookmarks, and bookcovers
Wood-link belts
Jigsaw puzzles
Christmas decorations
Clothes hangers
Scenery frames for an assembly

Correlation with Social Studies

Work in connection with social studies is of two types: (1) projects which are undertaken by the pupils in their regular shop periods to illustrate content studies in social-science classes and (2) group projects carried on in the shop during regular social-science class meetings, when the social-science teacher accompanies the pupils to the shop. Keeping free periods in the shop program makes possible this arrangement by advance scheduling.

A rather ambitious project, involving several subject fields and several teachers, was the study and reproduction, by a sixth-grade class, of the first Colonial Thanksgiving dinner. About 35 pupils (one-half the grade) and the teachers of art, social science, home economics, and shop worked together on the project.

Information was gathered in the social-science classes on the following topics:

When was the first Thanksgiving dinner held and for what purpose?
Who attended?
What was the menu?
What kinds of dishes and cooking utensils were used?
What kinds of entertainment and games were enjoyed?

In the shop laboratory each pupil made a pewter plate from which to eat, and groups working together made serving dishes, platters, cooking utensils, and plates for the teachers, who were guests. Each pupil represented some character and made his costume in the art and sewing classes. He impersonated this character throughout the entire celebration. Guns and swords were made in the shop, and invitations were prepared on parchment paper made in the art and shop classes. Committees were organized for the various tasks, such as buying food, preparing food, cooking food, setting and decorating the table, serving, planning games to be played after dinner, sending invitations, etc. To describe this project in detail would take too much space. Suffice it to say that these sixth-grade pupils planned and served a turkey dinner with all the "fixings," as nearly like the first Thanksgiving dinner as information permitted them to make it. This project provided research, instruction, and fun.

Other social-science projects completed in the shop are listed below.

A. Indians: Grade I
Tepee, wigwam, fires, and fireplace
Pottery, beadwork, war clubs
Bow and arrow, ax, hatchet, peace pipe
Indian village
Tanning skins and furs
Bowls, spoons, birch-bark baskets
Totem poles, tom-toms, drums, rattles
Sandals, moccasins, necklaces
Pack rack, war bonnet

B. Eskimos: Grade II
Eskimo village
Sled, dog harness
Snowshoes, sun goggles
Clay animals

C. Mexico: Grade III
Mexican village
Stove frame, five-gallon oil-can stove
Rugs, baskets, pottery
Clay animals

D. Weaving: Grade IV
On various types of looms
Basketry
Belt, lanyard, leather quirt, dog leash, watch fob
Necktie, hatband
Footstool, rug
Snowshoes

E. Transportation: Grade V
Covered wagon, train, cart, sled, airplane
Barge, paddle-wheel boat, automobile

F. Colonial life: Grade VI
Log house, with fireplace and fireplace accessories
Frame cabin, with fireplace
Furniture—bed, chair, cradle, bedclothes, rug, coarse tablecloth, oil lamp
Pewter dish and spoons
Candle-making—dipping and molding
Transportation—boat, cart, sled, wagon, train
Jigsaw puzzle maps of states, diorama
Model of Mount Vernon
Bow and arrow, traps

Correlation with Mathematics

Few projects are completed which do not require measurement and the use of mathematics. In the classroom a sixth-grade pupil may accurately work out problems in fractions and yet in the shop have trouble in finding the middle of a board 7¼″ wide. For example, a project involving fractions was causing difficulty to a fourth-grade pupil, and the teacher of arithmetic was asked to help. The pupil wanted to make a board on which to hang twelve keys 2″ long and 1″ wide at their greatest dimension. A margin of ¾″ was wanted all around the board. A plan was worked out as follows:

Project.—Making a key board
Problem.—Hang 12 keys 2″ x 1″ with holes ¼″ from top of key
Have ¾″ margin

Materials.—
1 piece of walnut ½″ x 5½″ x 10¾″
1 dozen key hooks

The mathematics involved and the steps followed in preparing the working drawing are shown in Figure 2.

Other problems involving mathematics are listed below.

All plans involve measurements.
Some involve fractional measurements, such as ½ of 3¾″ = ? (This problem will "stump" many sixth-grade pupils.)

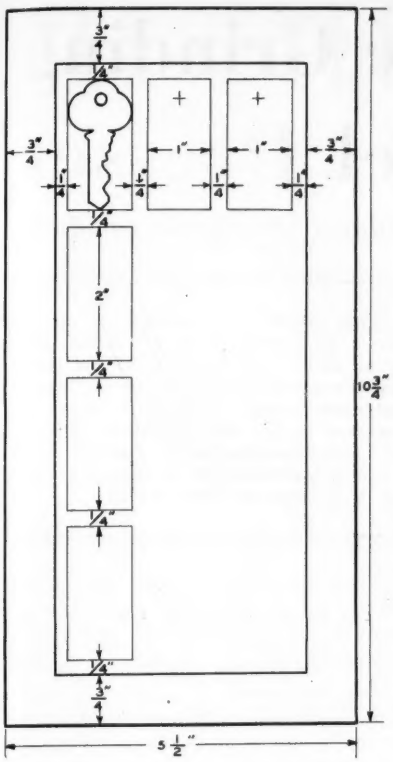


Figure 2.—Working plan for a key rack, illustrating mathematical steps used to determine measurements.

1. Find width of board.
   3 keys wide $= 3 \times 1'' = 3''$
   4 spaces of $\frac{1}{4}''$ each $= 4 \times \frac{1}{4}'' = 1''$
   2 margins of $\frac{3}{4}''$ each $= 2 \times \frac{3}{4}'' = 1\frac{1}{2}''$
   $3'' + 1'' + 1\frac{1}{2}'' = 5\frac{1}{2}''$
   Board must be $5\frac{1}{2}''$ wide.
2. Find length of board.
   4 keys long $= 4 \times 2'' = 8''$
   5 spaces of $\frac{1}{4}''$ each $= 5 \times \frac{1}{4}'' = 1\frac{1}{4}''$
   2 margins of $\frac{3}{4}'' = 2 \times \frac{3}{4}'' = 1\frac{1}{2}''$
   $8'' + 1\frac{1}{4}'' + 1\frac{1}{2}'' = 10\frac{3}{4}''$
   Board must be $10\frac{3}{4}''$ long.
3. Find location of hooks.
   Margin $= \frac{3}{4}''$
   Space $= \frac{1}{4}''$
   $\frac{1}{2}$ key width $= \frac{1}{2}''$
   $\frac{3}{4}'' + \frac{1}{4}'' + \frac{1}{2}'' = 1\frac{1}{2}''$
   Hook 1 is $1\frac{1}{2}''$ from edge of board.
   $\frac{1}{2}'' + \frac{1}{4}'' + \frac{1}{2}'' = 1\frac{1}{4}''$
   Hook 2 is $1\frac{1}{4}''$ from hook 1.
   Hook 3 is also $1\frac{1}{4}''$ from hook 2.

Use of land-measuring instruments
Measurements of lumber
Cost of lumber—figuring board feet of lumber
Planning and making crayon box—Grade II

Correlation with Other Subjects

Projects in five other areas which have been correlated with industrial arts will be listed without giving detailed descriptions.

Athletics

Ball bats, wands, dumbbells, tennis-net posts
Ping-pong table and racquets
Shuffleboard equipment
Darts and targets
Restringing racquets
Height-measuring equipment
Jumping standards

Home Economics

Pewter plates, trays, dishes
Serving-tray table, serving tray, serving mat
Coasters, hot-dish mats, cork luncheon sets
Knife-and-fork box
Rolling pin
Sharpening knives
Bookcase and book shelves

Dramatics and Assemblies

Scenery frames
Stage furniture—chairs, benches, fireplace, table, wand, angel wings, shields, hats
Christmas-tree brackets, lighting, decorations
Candlesticks
"Special day" stage settings

Christmas Activities

Repair and paint toys
Make new toys
Make Christmas presents for parents and friends
Make and repair Christmas gifts for Hyde Park Neighborhood Club
Repair books
Work out plans for a shop at home (hints for parents)

Correlation with the Home

One evening each week the shop is open to parents, working together or individually, to teachers, and to graduate students of the Department of Education, many of whom are grateful for the opportunity to use the shop equipment and to obtain the help of the instructors in carrying out projects for their own pleasure. The faculty and students have been invited to have teas and parties in the shop, to become acquainted with the equipment, and to examine the articles which have been made there.

Concluding Comments

Each of the many projects listed above could be described in detail. An important consideration is that in most cases the project grew out of a pupil's interest in something about which he was studying. It may have been a group interest, but at any rate the interest was strong enough to make the individual or the group "do something about it."

There has never been a better definition of industrial arts than the oft-repeated statement of Bonser and Mossman: "Industrial arts is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes."[1] In our shop laboratory we offer as many of the materials as possible, with tools, equipment, and opportunity to make the changes. However, stress is placed not so much on the "increase in values" as on the "problems of life related to these changes." It is hoped that the pupils will use the laboratory to express their own ideas and to illustrate and objectify their own learning by careful observation, accurate thinking, and skilful manipulation.

Our experience in the Laboratory Schools justifies the following conclusions with regard to correlation of the industrial arts with other subjects. (1) What a child can do with his hands is one good indication of his understanding. (2) Doing things with the hands should be an integral part of the learning activities in any area or subject. (3) Pupils enjoy the chance to prove their knowledge or understanding by doing handwork. (4) Teachers can make their teaching more effective and practical by working in the shop with their pupils. (5) Several teachers can work together effectively in providing hand activities for children learning about various things. (6) Effective tool skills can be acquired through the program of correlation. (7) Correlation vitalizes each subject concerned. (8) Correlation gives more interest in acquiring information and greater satisfaction in expressing ideas through action as well as through words.

[1]Frederick G. Bonser and Lois Coffey Mossman, *Industrial Arts for Elementary Schools*, p. 5. New York: Macmillan Co., 1923.

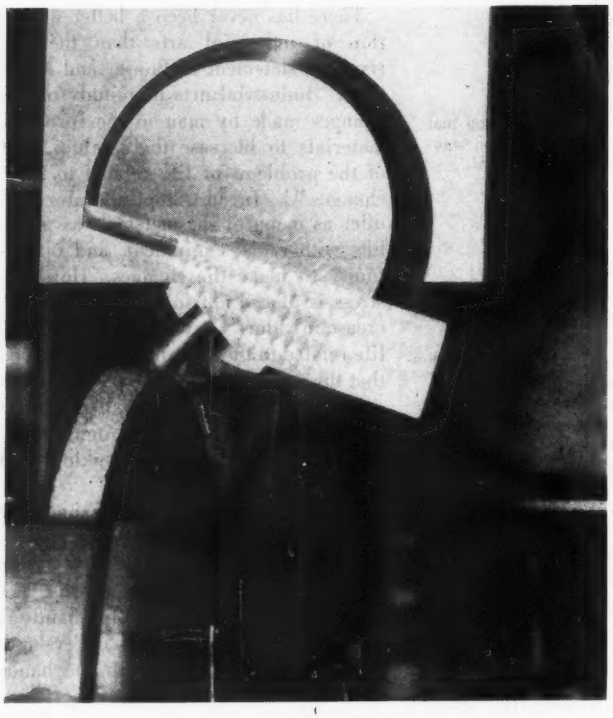
[EDITOR'S NOTE: This article is reprinted from the *Elementary School Journal* for December, 1943, by special permission.]

Coming in June!

SCHOOL SHOP is pleased to announce that at the request of the War Department, the June issue will be a special Pre-Induction Training Number. A series of articles will be carried which are designed to be of practical help to shop teachers and administrators in carrying forward the pre-induction training program in the schools. This number will be of special help to teachers planning their offerings in the pre-induction field for next fall.

In addition, the June issue will also carry the regular Supplier's Directory feature which has proved so popular in the past.

Watch for the June number!



Angle Grinding Wheel Dresser

BY *Jon P. Adams* AND *M. B. Goodwin*

Machine-shop instructors will remember the turret tool post described by these same authors in the February issue of SCHOOL SHOP. This wheel dresser is the second in a series of excellent projects which have been designed and constructed in the Proviso Township High School vocational machine shop at Maywood, Illinois, and which will be published from time to time in SCHOOL SHOP. Mr. Adams is in charge of the machine shop and Mr. Goodwin teaches machine drawing and is also on the faculty of the University College division of Northwestern University.

TESTED INSTRUCTIONAL PROJECT

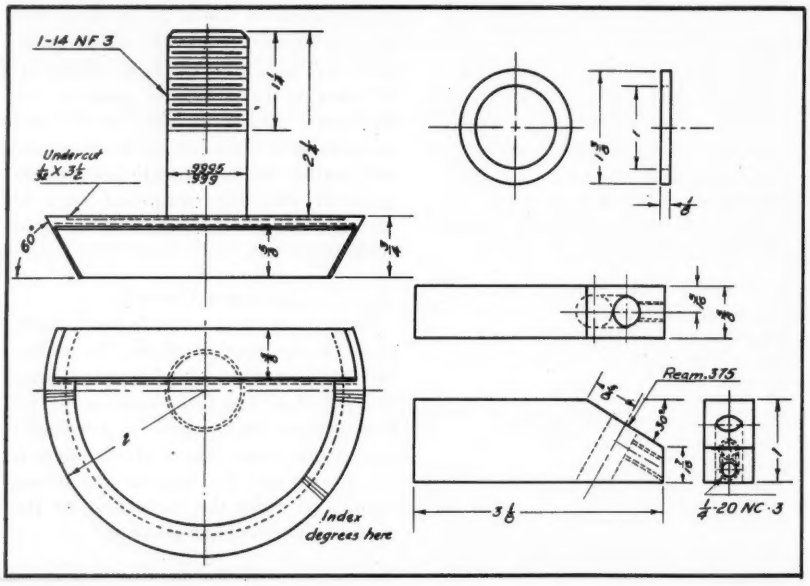
Two methods can be used in the surface grinding of angles. One method is to hold the piece to be ground on an adjustable angle plate. (An adjustable angle plate will be presented in a future article.) The second method is to dress the required angle on the grinding wheel.

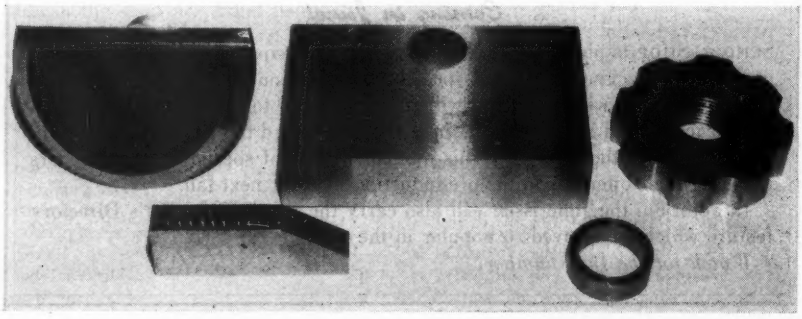
Dressing a wheel to a specified angle requires an angular wheel dresser. This article deals with the construction of a wheel dresser with a vernier to give angles correct to 5′. The dresser may also be constructed without the vernier. The photographs show a dresser without the vernier. The drawings, however, show a dresser with the vernier. The vernier was added to the wheel dresser after it had been photographed.

The following machine operations are necessary in the construction of the angle wheel dresser: (1) straight turning, (2) boring, (3) threading, (4) turning an angle with the compound rest, (5) slab milling, (6) slotting, (7) marking degree graduation by aid of a dividing head, and (8) surface grinding.

The numerous machine-tool operations involved make the wheel dresser a worthwhile project in tool making. The finished product is a desirable piece of shop equipment.

The details of the construction will not be discussed as the drawings are complete.





The authors made the pictured dresser of S. A. E. 1020 steel, unhardened.

In addition to the drawings the reader may find the following directions helpful:

The dial was turned to size and the spindle threaded. The graduations on the dial were cut on the milling machine, using a fly cutter ground to a sharp point to scribe the lines. To insure clean-cut lines on the dial it is advisable to form a "goose neck" on the fly cutter.

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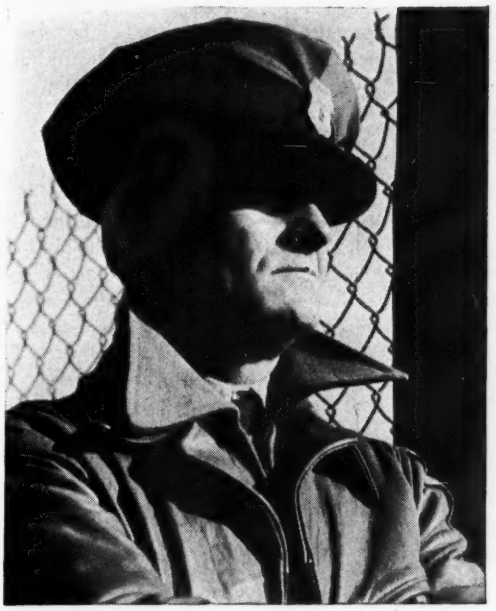

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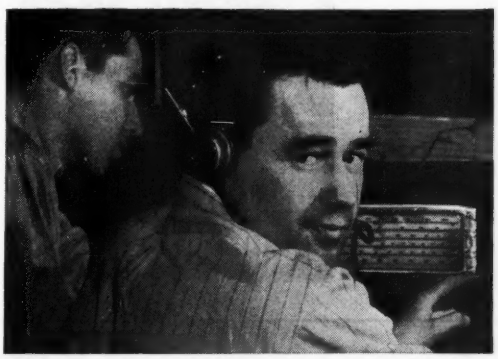

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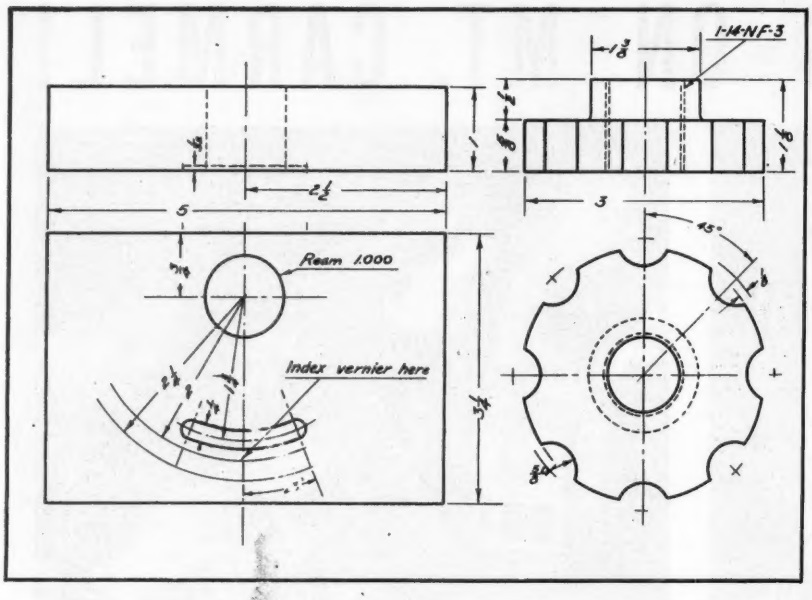


The "goose neck" gives a slight "spring tool" effect.

The fly cutter may be held on the milling machine arbor by means of a fly cutter holder.

The fly cutter holder mentioned above is shown in detail in the drawings. Note that two different sizes of fly cutter may be used. The advantage of the milled slots in the cutter holder is that the cutter will seat squarely.

In cutting the degree graduations, the dial must be held in the dividing head chuck. Indicate the piece so that the slide is parallel to the machine bed. The piece must also be indicated so that the top of the angular surface is parallel to the machine table. Lines cut with the piece in this position will be of uniform width. The table should be raised so that a trial cut shows proper definition of line. The length of the line is determined by the longitudinal feed dial. The 1° lines are ¼" in length, the 5° lines 5/16" and the 10° lines ⅜".

The indexing of each degree requires 1/9 of one turn of the crank, or 3 holes in the 27-hole circle, or 9 holes in the 81-hole circle. The fly cutter is held stationery during this operation.

In cutting the vernier scale the block must be mounted on a 1" mandrel and chucked in a vertical position in the dividing head. The lines are scribed from a ¼" slot, which is milled as shown in the drawing. The slotting operation may be eliminated by scribing the lines from the 1" hole.

The indexing of an angular vernier requires that the space of 23° on the dial be divided into 12 divisions on the block. The procedure is as follows:

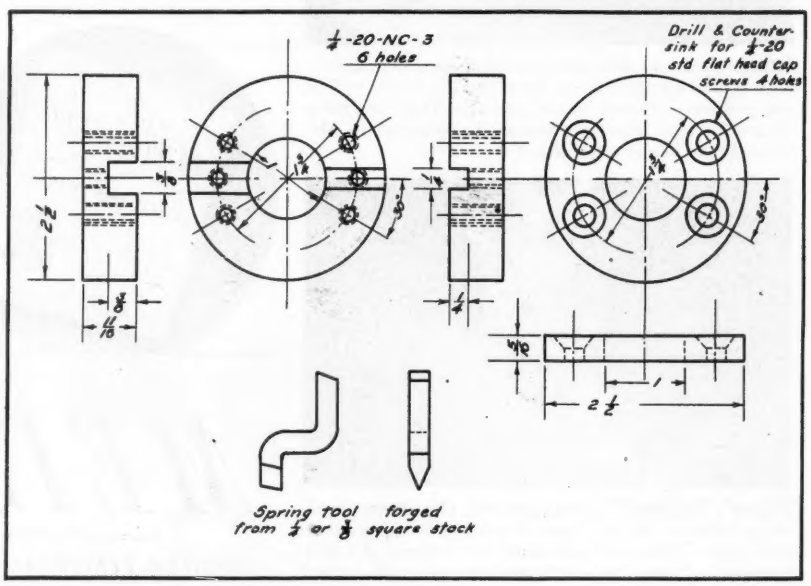
One turn of the crank on the indexing head will turn the spindle 9°, therefore 23° ÷ 9° will give 2-5/9 turns of the crank for the entire 23°. The indexing for 1 space would be 1/12 of 2-5/9 turns.

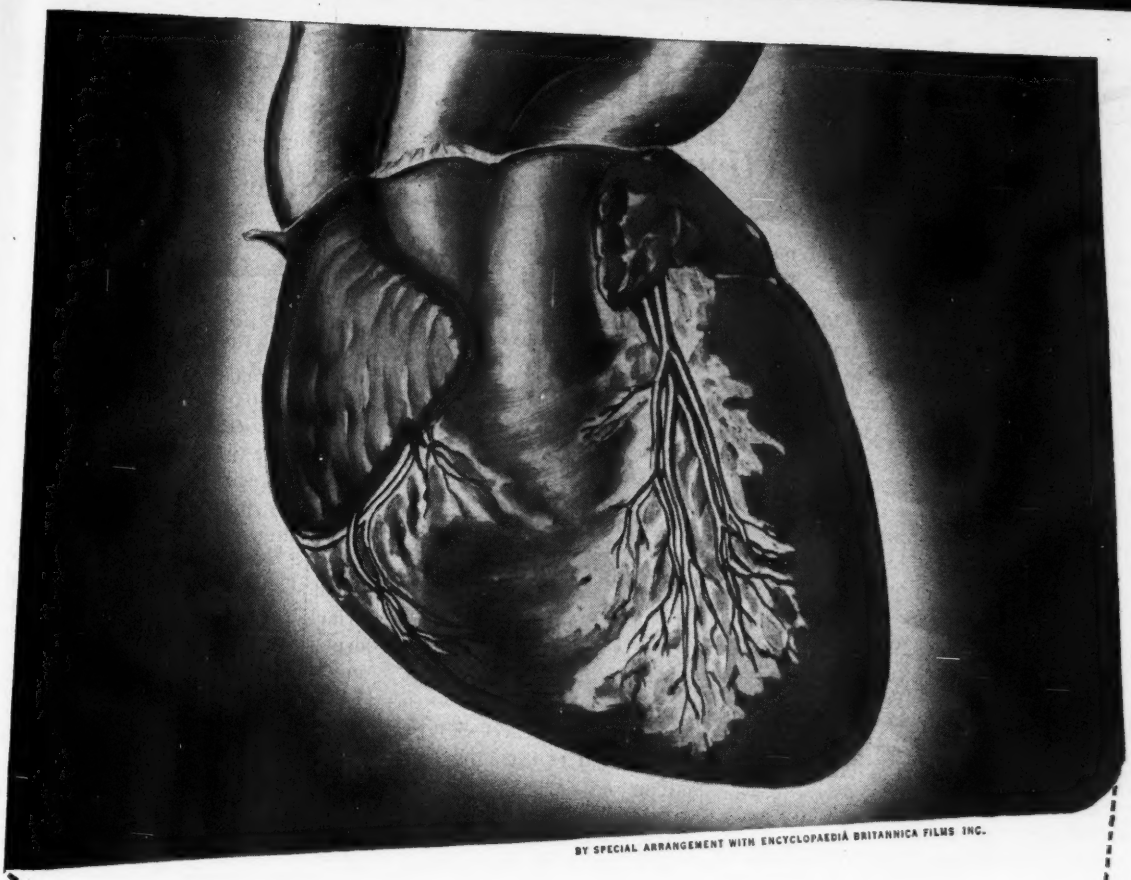
Thus $\frac{2\text{-}5/9}{12} = \frac{23}{9} \div 12$ or $\frac{23}{108}$ or 23 spaces on a 108-hole circle.

Perhaps there will not be an indexing plate with 108 holes available so one will need to be made. The indexing for the plate is simple: $\frac{40}{108} = \frac{20}{54}$ or 20 spaces on the 54-hole circle for each division indexed.

The above method of indexing the vernier for the angle wheel dresser is the most accurate. However, there is another method that can be used which, while not as accurate, is much simpler. The error involved is so small that it is practically negligible. In the second method, use the angular indexing table in the *Machinery Handbook*. The angle to be indexed is 1/12 of 23° or 1°55′ or 6900". One turn of the crank = 9° or 32,400". Therefore, $\frac{6900}{32400} = .21296$ turns of the crank. We find in the table .2128 = 10 holes on the 47-hole circle. This is correct to three decimal places.

To make the vernier scale read correctly, or zero in case of the plain dresser, the scale is carefully set at zero. The top surface which forms the slide for the diamond holder is then surface ground. Absolute zero is obtained by grinding the slide after assembly. The degree divisions or 5′ vernier divisions will then read accurately.





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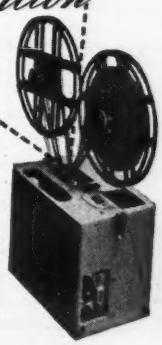


A Short Course in Pencil Rendering

BY *Howard W. Boekeloo*

Drafting teachers will be interested in the experiences of the author in teaching a subject which is seldom covered in high-school drafting courses—pencil rendering. This type of work has generated an unusual amount of interest among students at Kalamazoo, Michigan. Central High School where Mr. Boekeloo has been an instructor for many years.

FOLLOWING a one-year basic course in senior-high-school general drafting, we offer a two-year elective in both machine and architectural drawing. In the latter subject, one class period of 55 minutes per week is devoted to freehand drawing leading to some proficiency in pen and pencil rendering of architectural drawings. During the first year the student is acquainted with pencil sketching, details of which are presented in this article.

After an introduction to the subject by explanation of the purpose and meaning of pencil rendering, we illustrate its application to architecture by exhibiting drawings showing the preliminary sketch of completed buildings secured from architects, taken from magazines, or cut from newspapers.

Our first experience is preparing the 2H, HB and 3B pencils, for which we use the draftsman's special pencil sharpener. This cuts away the wood only, and the pencils are then held at 45° and one side is rubbed down on a piece of fine emery cloth to enable students to make a broad stroke. Turned 180°, they will also make a fine, narrow stroke.

Any good white drawing paper with a fine grain or "tooth" is suitable for this work. We then lay out the rectangles and fill in the first sheet, Fig. 1, after trying out each pencil at the top of the sheet to get the "feel" of the pencil in making the broad, ironed-out stroke.

Instructions for this first exercise include a caution to use a sheet of toweling under the hand to keep the paper clean and to use sufficient pressure on the pencil. (The last is directly opposite to the usual admonition of the drafting instructor, who pleads for light lines.) Borders are put in with the broad side of the HB and may be of various types. After being cleaned with a soft eraser to remove finger marks and construction lines, the drawing is trimmed to notebook sheet size and placed on a cardboard frame to be "fixed." For this we use a "flytox" sprayer and Devoe and Reynolds "Fixativ." With the sprayer held about 10″ from the drawing, about 20 vigorous strokes, evenly distributed, will coat the drawing so that the softer pencil lines will not rub off or smudge.

The next sheet, Figure 2, is a problem in sketching foliage, including some types of shrubs and ground plantings found about the landscaped home. Three principles are emphasized for the student's observation in copying these units: (1) type of stroke (broad or fine), (2) length of stroke (foliage is usually shown with a short stroke), (3) direction of stroke (growth of shrub is usually up and out from center).

To select the part of the composition to be reproduced, the student makes a stencil by cutting from a small sheet of paper an opening the same size as the

Figure 1.

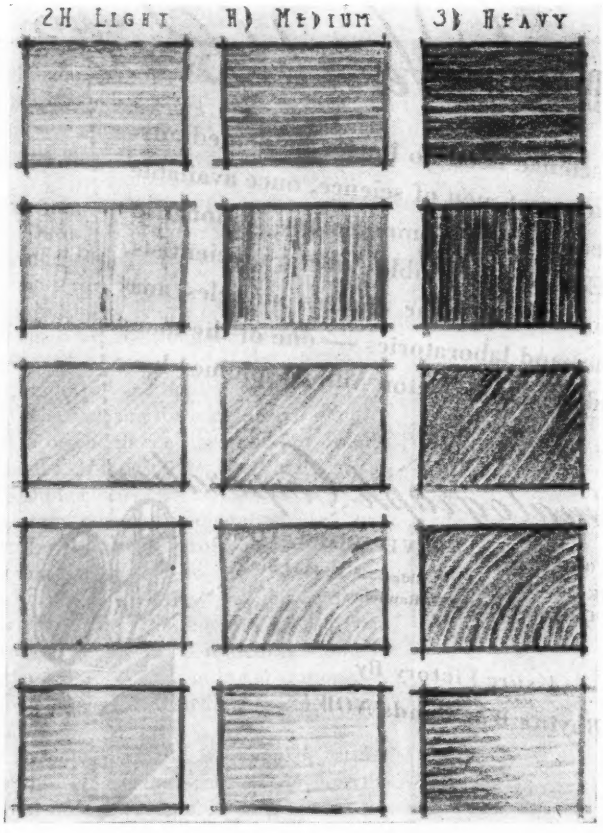
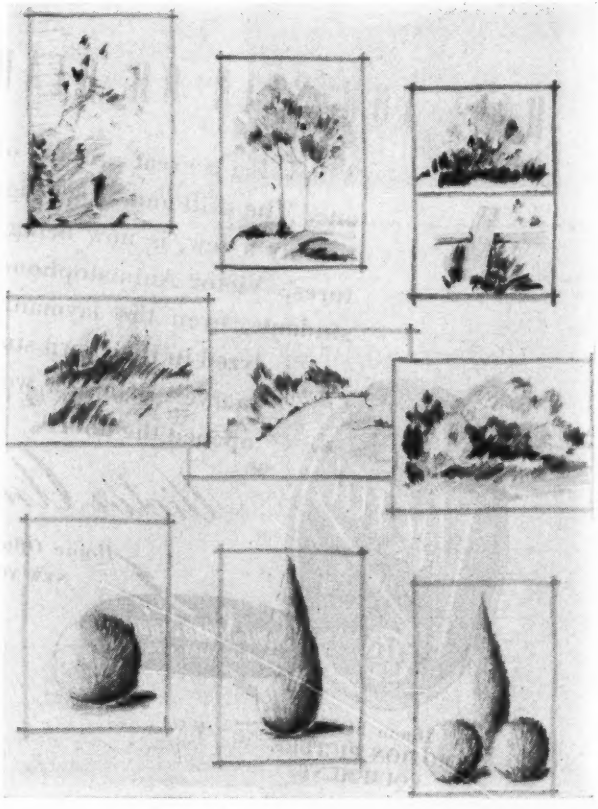
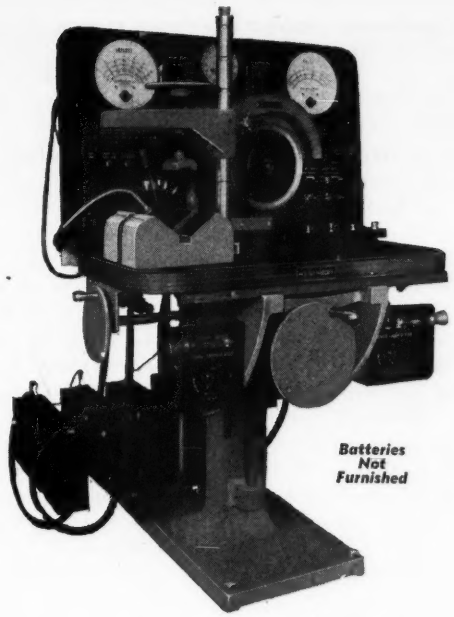


Figure 2.





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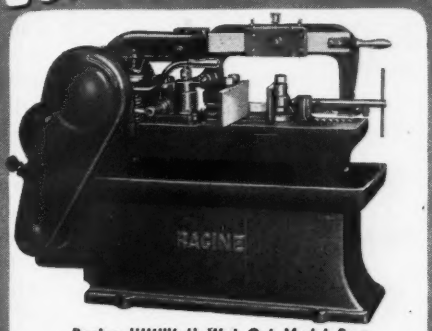

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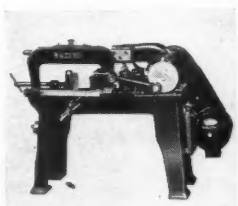

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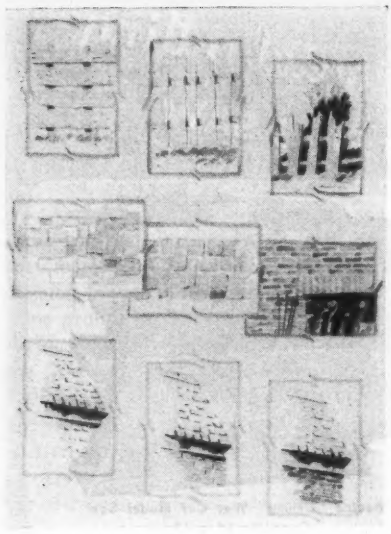


Figure 3.

rectangle on the sheet on which the drawing is to be copied. Then the stencil is placed over the copy and switched about until the proper composition or part to be reproduced is decided on.

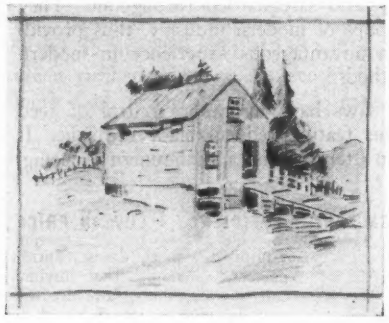


Figure 4.

Thus the attention can be focused on only that material to be used and its relative position on the student's sheet is quite apparent. A number of smaller units which are copied to be one by one look much less formidable to the student than one large problem.

Figure 5.

This particular problem and others shown have been taken from the booklet *Sketching with Venus Pencils* by Harry W. Jacobs and published by the American Pencil Co., but unfortunately this book is out of print at present. The bibliography at the conclusion of this article should, however, supply one with plenty of other material.

Figure 3 touches on the treatment of various building materials. Emphasis is placed on accent of shadows and suggestions of texture, surface, and color.

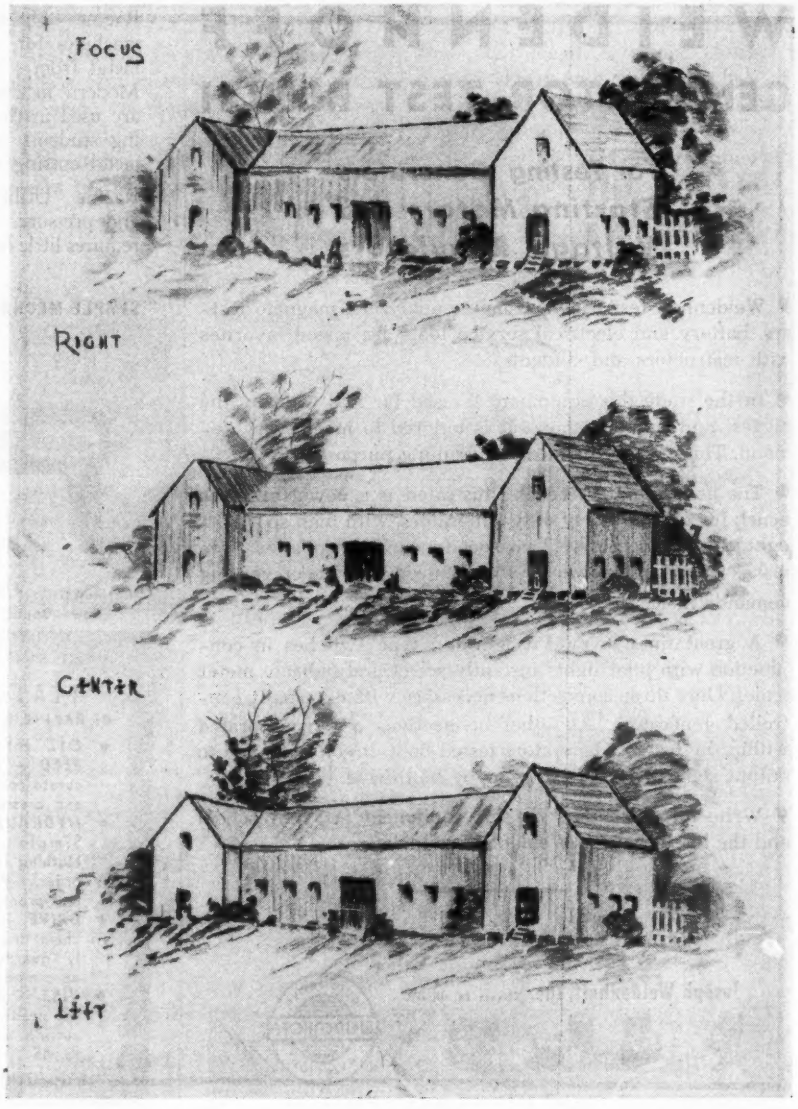
Figure 4 is a study in angular perspective. Considerable emphasis is placed on the principles of perspective involved in drawing the preliminary outline of this subject.

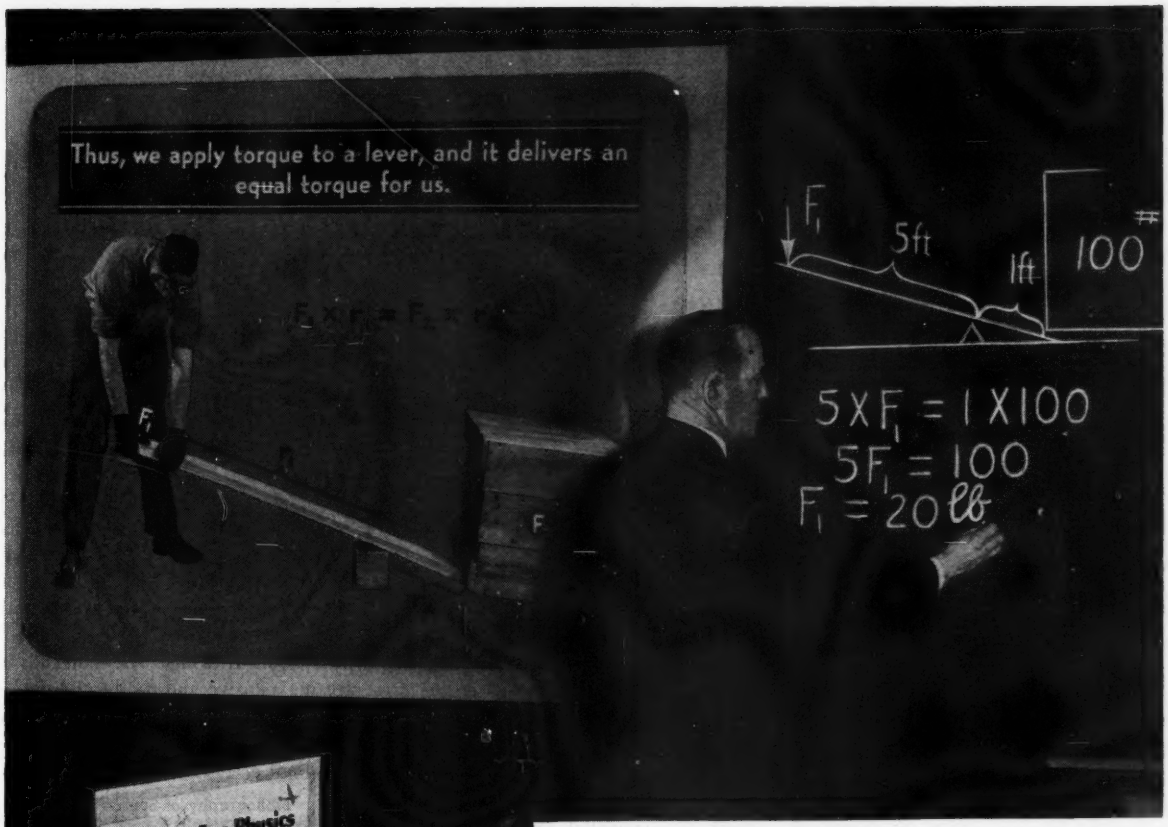
In the rendering of trees, special attention is given to general shape, light and shadow, treatment of branches, and trunk and root forms. These points are brought out in a discussion preliminary to drawing Figure 5.

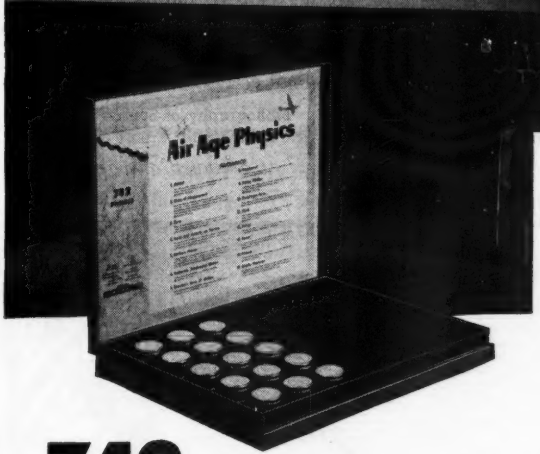
Figure 6 is a problem in focusing the attention on various "centers of interest" in the same sketch. The student is given a photograph of the first sketch but draws the second and third after having instruction about methods of securing interest in different parts of the same subject. These include: (1) contrasts in tone, (2) subordinating secondary features, (3) placing lines in the sketch which bring the eye to the center of interest, and (4) showing more detail at the focus point. The sketch shown is taken by special permission from A. L. Guptill's *Sketching and Rendering in Pencil* as also is Figure 7.

Our course in architectural drafting

Figure 6.







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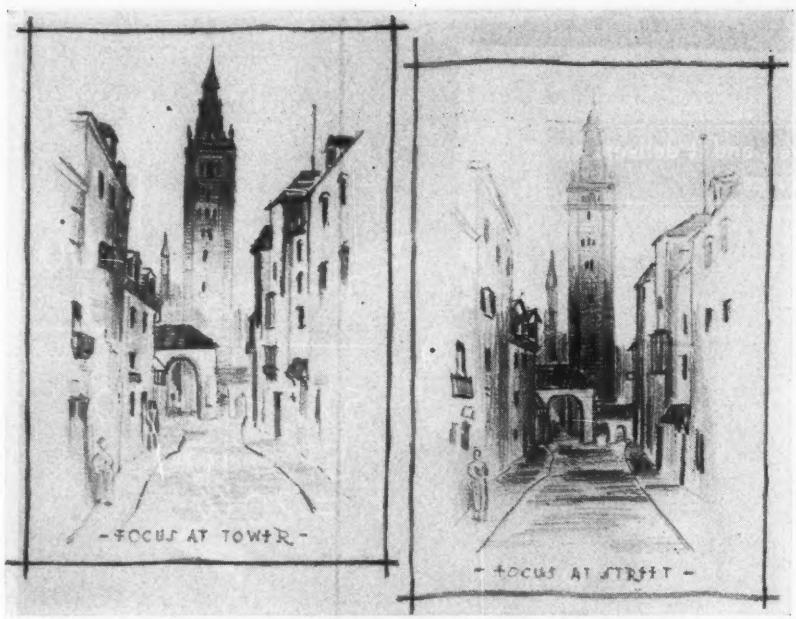


Figure 7.

has progressed during this period and by the end of the second semester the student will have completed the floor plans and elevations of the home he has designed. As a last sketching job he will render the front elevation as shown in Figure 8. This is made on tracing paper from the original drawing of this elevation. It is not traced line for line but from the standpoint of a sketch with some lines omitted and others accented for shadow effects. It is treated to some extent as a parallel or one-point perspective. From various sources the student selects material for landscaping effects such as fences, pergolas, trellises, varieties of trees and shrubs, use of stone or brick walls, hedges, brick, flagstone or concrete walks or drives, etc. Our text, Bush and Townsley's *Problems in Architectural Drawing*, shows various illustrations of rendering of windows and cornices and general treatment. No two students will handle the job alike, even from the same house design, and a variety of work is thus produced. This problem is an application of all of the principles previously studied and a fitting conclusion to the course.

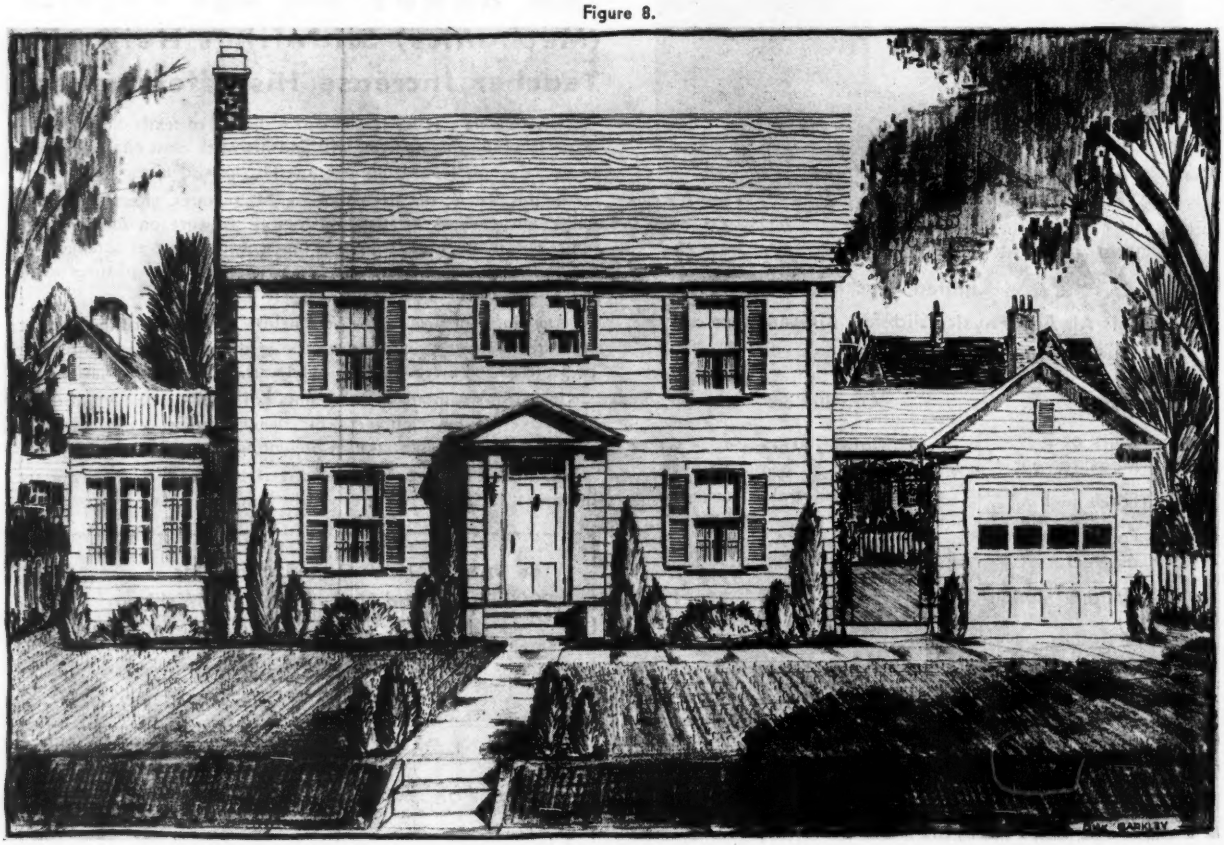
It has been found that most students, regardless of a tendency to regard art as difficult, are amazed at their success at rendering. Many who are only mediocre at using instruments will do much better at freehand efforts. This phase of architectural drawing is not difficult to teach and gives a pleasant variation, correlating with the work produced by instrument drawing. The materials used are inexpensive and easily obtained and the training offers a source of pleasure and inspiration to the individual for out-of-school activities.

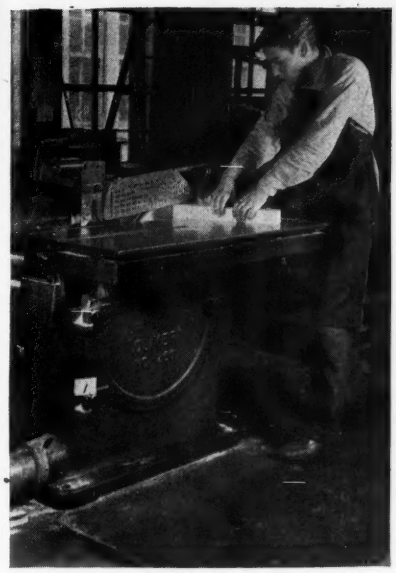
Bibliography of Source Material

Pencil Drawing by Ernest W. Watson.

(Continued on page 24)

Figure 8.





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BY *A. V. Hamel*

This economical safety precaution has much to commend it. A. V. Hamel teaches pattern making at the Boys' Technical High School, Milwaukee, Wisconsin.

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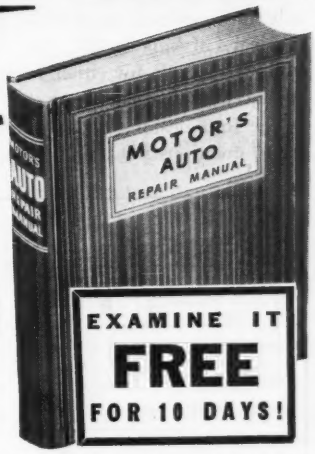

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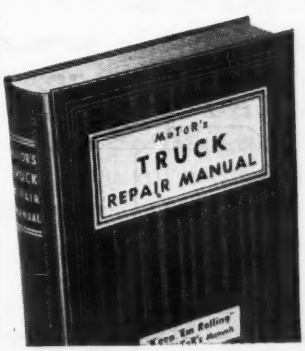

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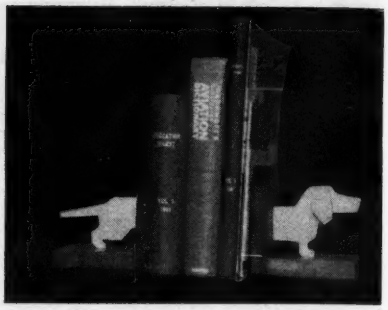
Book-End Designs

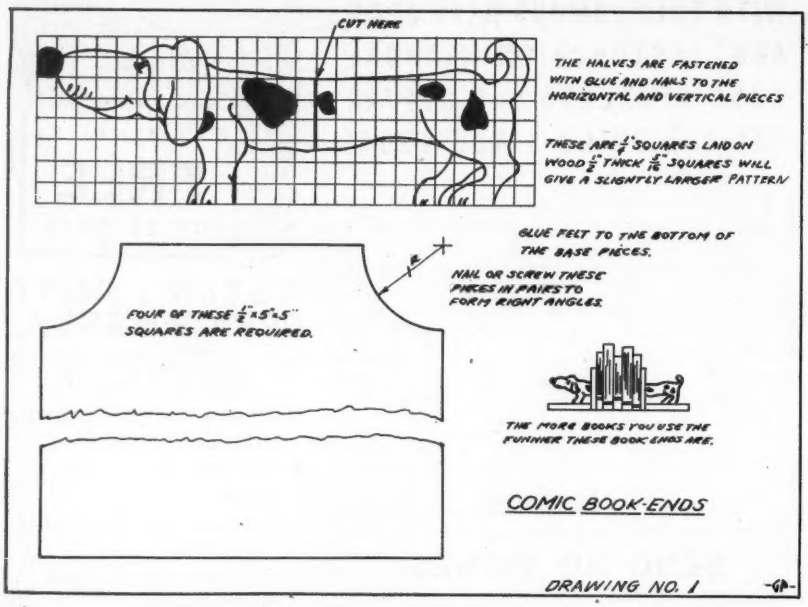
BY *Ward Sager*

The perennial book end is always a good introductory project in woodworking, particularly if the design is somewhat out of the ordinary. Here are four distinctive plans which are useful for teaching elementary woodworking processes. The author is a member of the faculty of the Central Michigan College of Education, Mount Pleasant.



BOOK ends are ever-popular projects among students in industrial arts classes. Easily constructed, requiring for the most part only the common hand tools, and economical of materials, they provide suitable projects for either beginning or advanced students in shopwork.

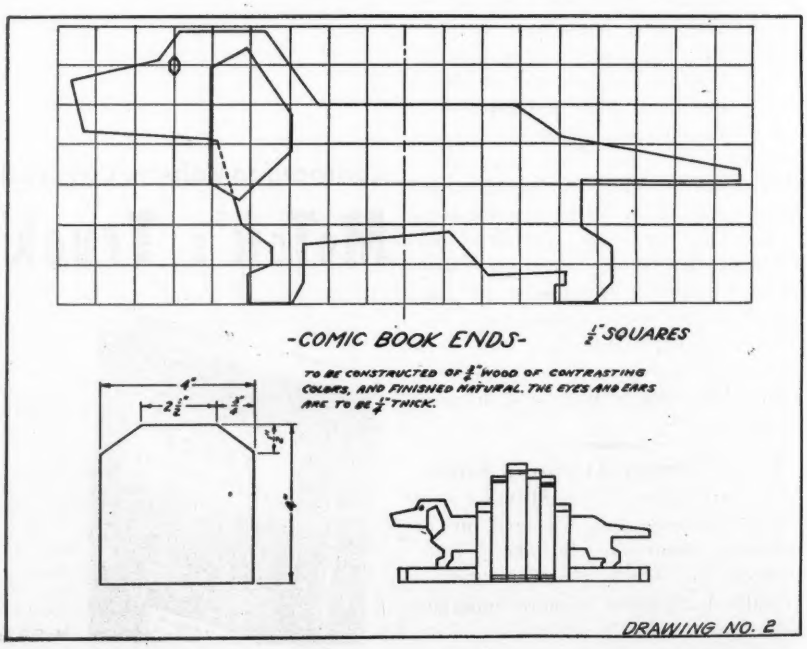
The four designs here shown are not recent creations but they have a definite appeal for students at different age levels. Each design involves the development of a pattern by the method of squares, use of various layout and hand-cutting tools and, where feasible, a jig or band saw, in addition to the application of suitable finishes.


CUT HERE
THE HALVES ARE FASTENED WITH GLUE AND NAILS TO THE HORIZONTAL AND VERTICAL PIECES
THESE ARE 1/4" SQUARES LAID ON WOOD 1/2" THICK 5/16" SQUARES WILL GIVE A SLIGHTLY LARGER PATTERN
GLUE FELT TO THE BOTTOM OF THE BASE PIECES.
NAIL OR SCREW THESE PIECES IN PAIRS TO FORM RIGHT ANGLES.
FOUR OF THESE 1/2"x5"x5" SQUARES ARE REQUIRED.
THE MORE BOOKS YOU USE THE FUNNIER THESE BOOK ENDS ARE.
COMIC BOOK-ENDS
DRAWING NO. 1

The book ends shown in drawing No. 1 make an excellent coping-saw project for 6th- or 7th-grade students. Basswood, white pine, or yellow poplar dressed to ½" may be used and the parts fastened together with glue and brads. For finishing, an enamel undercoat or flat paint is first applied. The base and uprights are then given a coat of mahogany or reddish brown enamel and the hound dog a coat of light or medium brown enamel. The body outlines of mouth, ears and legs are narrow lines of black enamel, as are the spots. Pieces of felt glued to the bottom of the bases complete the project.

The design shown in drawing No. 2 employs the use of woods of contrasting colors to which a natural finish is applied; however, similar effects may be obtained by use of wood stains. Gumwood or walnut for bases and uprights, and any of the light softwoods for the dog cut-out would give the desired color contrast. These book ends are made from ¾" material, and the pieces are fastened with glue and flat-head wood screws. The eyes and ears are cut from scrap stock planed to ¼" thickness, and are fastened with glue.

The dachshund design in drawing No. 3 depends for artistic effect on a small amount of easily executed wood carving. The carving can be done with a safety razor blade and pocket knife. However, a veining tool will produce better work. Any softwood that lends itself to wood-carving may be used. Philippine mahogany is especially suitable. The carving is laid out as shown by the lines on the drawing to produce the effect of upper and lower jaws of the mouth, wrinkled forehead, and folds on the long, hanging ears. The hind legs are also accentuated by two curving lines that are boldly carved. Opposite sides should be carved alike so as to permit placing the book ends in any desired position. The eyes and nose are painted black, as indicated on the drawing. Reference to


-COMIC BOOK ENDS-
1/4" SQUARES
TO BE CONSTRUCTED OF 1/2" WOOD OF CONTRASTING COLORS, AND FINISHED NATURAL. THE EYES AND EARS ARE TO BE 1/4" THICK.
4"
2 1/2"
DRAWING NO. 2

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Delta 6" Jointer on Cast Iron Stand

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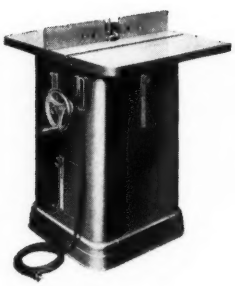

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Delta 14" Band Saw (wood-cutting or metal-cutting)

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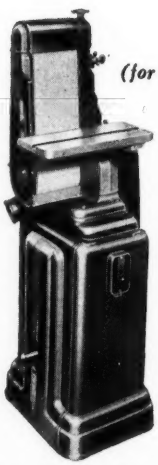
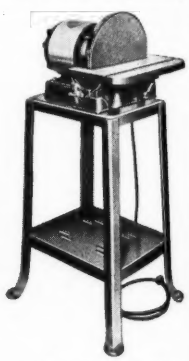
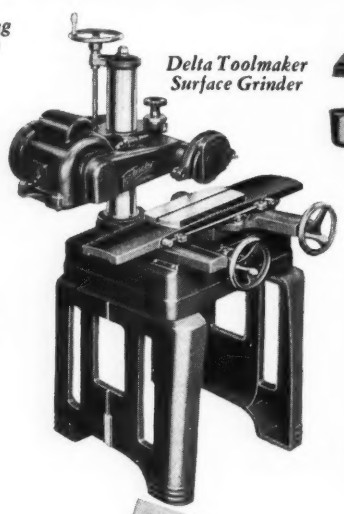


Delta Abrasive-Belt Finishing Machine



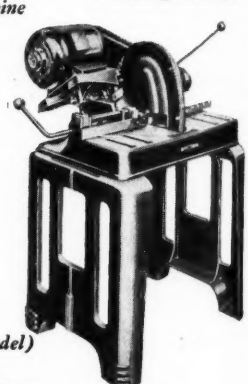
Delta Abrasive Disk Finishing Machine

Delta 12" Woodworking Lathe



Delta Toolmaker Surface Grinder

Delta Industrial Grinder with safety shields



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- ☐ "How to Plan a School Workshop."
- ☐ Price List of Delta Manuals and Project Books.

Name.....Position.....

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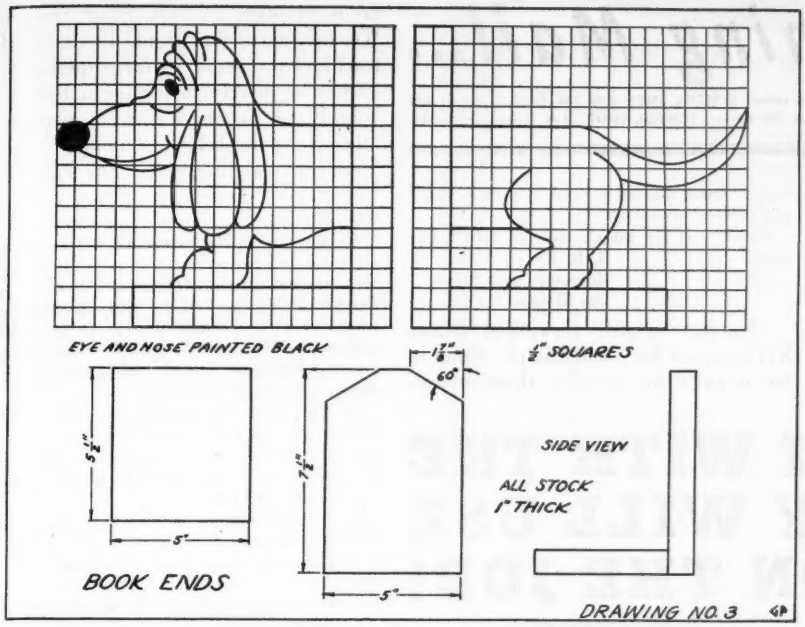
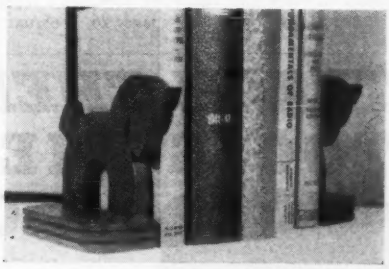


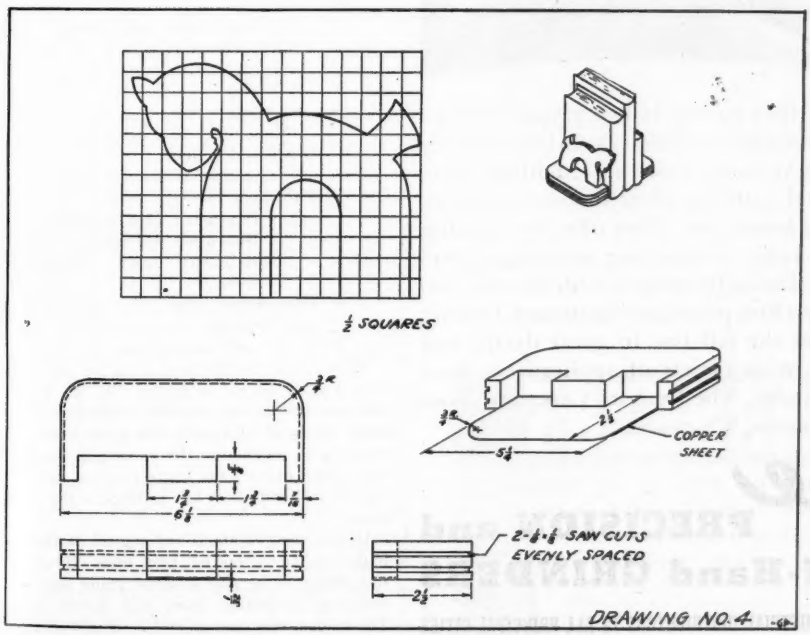
the photograph of the dachshund book ends should convey an idea as to the form and boldness of the carved outlines.

Drawing No. 4 shows a modernistic design featuring a horse or pony. The ribbed effect on the base pieces is obtained by first making saw cuts ⅛" deep with a power saw, after which the grooves are rounded with sandpaper. The portion of the bases to which the metal is fastened should be cut out to take care of the thickness of the metal, and this operation is best done on the power saw. The metal pieces are cut from 20- or 24-gauge sheet copper or galvanized iron. If copper is used, the pieces should be polished and lacquered before attaching with small wire nails, preferably copper nails. If galvanized iron or black sheet iron is used for the base pieces, they may be finished with one coat of mahogany or walnut shade enamel, or by using varnish size and gilt powders.

It should be noted that a small metal piece may be attached to the bases of all of these designs, so that the weight of a book at each end will prevent slipping. Pieces of felt glued to the bottom of the bases also help to keep them in position.



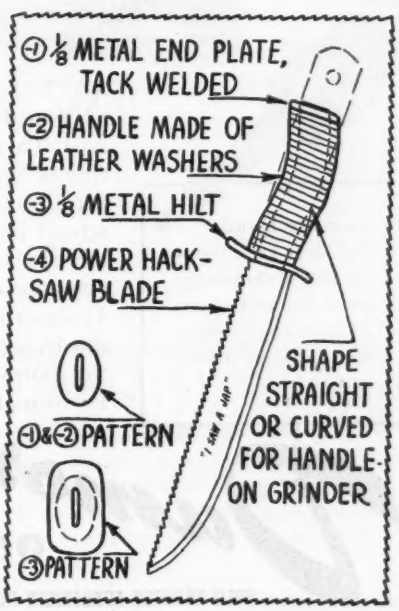
These particular designs have all been popular with students at various age levels and are particularly suitable for a boy's room.



Serviceman's Knife

BY *Stan Schirmacher*

This little project can be made from an old power hacksaw blade. The title, "I Saw a Jap," can be etched by acid or electric pencil on the blade of the knife. Stan Schirmacher teaches shop at the Tempe, Arizona, Union High School.


① ⅛ METAL END PLATE, TACK WELDED
② HANDLE MADE OF LEATHER WASHERS
③ ⅛ METAL HILT
④ POWER HACK-SAW BLADE
SHAPE STRAIGHT OR CURVED FOR HANDLE-ON GRINDER
①&② PATTERN
③ PATTERN
"I SAW A JAP"

IN THE Morning Mail...

Brief comments about **SCHOOL SHOP** *and the field it serves are invited. Address the Editor,* **SCHOOL SHOP**, *Ann Arbor, Michigan.*

Gentlemen:

Enclosed you will please find three items from your "Shop Teachers Service" department. I shall appreciate hearing from these companies.

It is with great interest that I read Mr. Stern's article ["Harmful Methods of Teaching Drawing," page 26] in the December issue of SCHOOL SHOP and again Mr. Levinson's reply ["Are They Harmful?" page 26, February issue]. Open minded perusal of such material can be very beneficial.

Thank you for taking care of the "study helps."

R. R. KYL
Roosevelt High School
Des Moines, Iowa

(We have gladly forwarded reader Kyl's request for "study helps" along to the proper firms as well as those of hundreds of other SCHOOL SHOP readers. We, too, agree that frank discussion of teaching problems is far superior to silence or merely mumbling a little in your beard. To prove it, we present another viewpoint below, generated by Mr. Stern's stimulating pen.—*The Editor.*)

Gentlemen:

As they say in the vernacular, "You said a mouthful," when you stated in connection with Mr. Stern's article, "Harmful Methods in Teaching Drawing," that, "not all drawing teachers will agree with the viewpoint of the author. . . ." Here is one drafting teacher who not only disagrees, but also resents the many implications, so here goes.

Drafting teachers would *not* get into a rut if they got out and worked in industry occasionally. If that is not possible or feasible, they can at least keep up with the latest advances and methods by:

1. Keeping posted on the latest books on drafting and related subjects.
2. Following trade publications and magazines.
3. Obtaining prints from industrial concerns.
4. Maintaining an up-to-date library of related trade catalogs. (These usually contain excellent drawings and illustrations.)

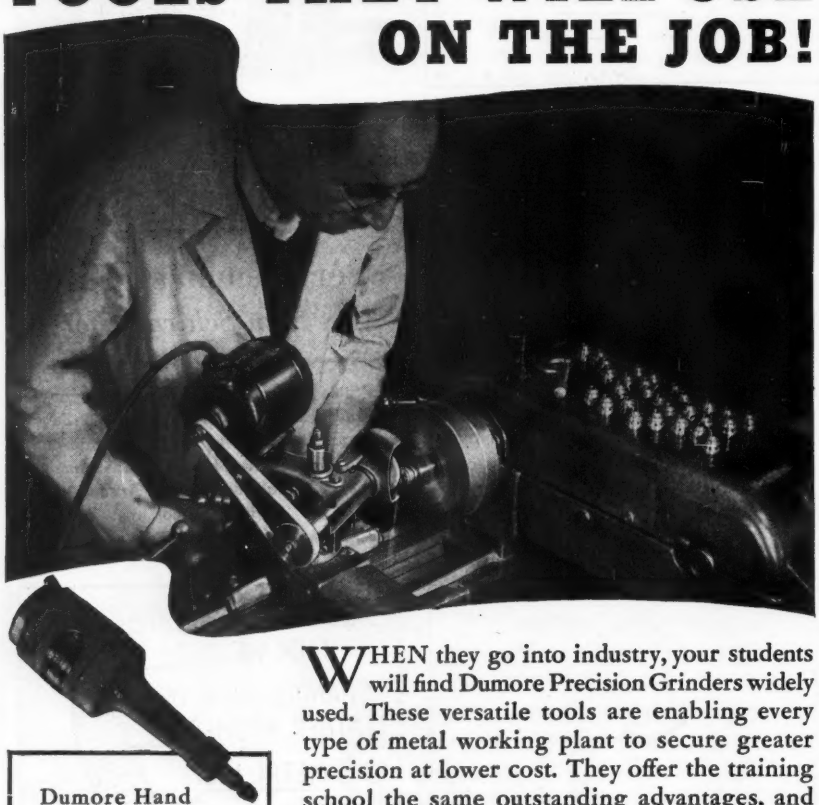
I was not aware that any drafting teacher instructed his pupils to divide the sheet into four equal parts. Reference to any accepted text on drafting, and also from the common-sense approach, the instructor can develop—even with a beginning class—the following procedure:

1. Decide on views necessary (how many, etc.).
2. Calculate spacing of views.
3. Layout sheet (border lines and title block) lightly.
4. Block-in views lightly.
5. Layout views lightly.
6. Draw dimension, extension, reference, and guide lines.
7. Have drawing checked.
8. Reline.
   - A. Centerlines.
     - (1) Arcs, circles, and curves.
     - (2) Horizontal.
     - (3) Vertical.
     - (4) Slant.
   - B. Object lines.
     (Same order as above.)
   - C. Hidden edge lines.
     (Same order as above.)
   - D. Thin lines.
     - (1) Dimension lines for angles.
     - (2) Dimension and extension lines.
     - (3) Reference and cross-hatch lines.
   - E. Dimensions (figures), arrowheads, and lettering.
   - F. Border and section lines.

With regard to the projection for the side view, I again am not in accord with Mr. Stern. The most expedient manner of obtaining the third views of objects is by *projection.* By lettering or numbering the corners in the first two views drawn, the corresponding corners can quickly and easily be identified in the third view.

One of the "earmarks" of a good draftsman is the ability to "lay in" light lines. He needs this ability to be able to draw guide lines for lettering, projection lines, and layout lines. The student may just as well be taught to draw

TEACH THEM WITH THE TOOLS THEY WILL USE ON THE JOB!



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light lines from the beginning, and thus be spared the necessity of unlearning a poor habit in the advanced courses or in industry. If the procedure listed above is followed and light lines are used (as indicated), these lines will be no detriment to the finished drawing. There will be no need for erasures, and the light lines will not show up on the blue print—for drawings made directly on tracing paper.

C. FALIK
Northeastern High School
Detroit, Mich.

Gentlemen:

It is indeed a pleasure to express once more my appreciation for your excellent magazine, SCHOOL SHOP. Each issue is filled with timely and challenging materials which should be of interest and value to every teacher in the broad field of industrial education. . . . Best wishes for your continued success.

SYLVAN A. YAGER, Chairman,
Department of Industrial Arts,
Indiana State Teachers College

Gentlemen:

Kindly arrange to have the two bulletins sent from the respective companies and may I take this opportunity to let you know that my instructors and myself look forward each month to the arrival of SCHOOL SHOP. We feel that your magazine plays an important part in both our regular day industrial training and our war-production training programs.

W. CARL KAUFFMAN
Supervisor, Industrial Training,
West New York, New Jersey

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from Washington *from page 34*

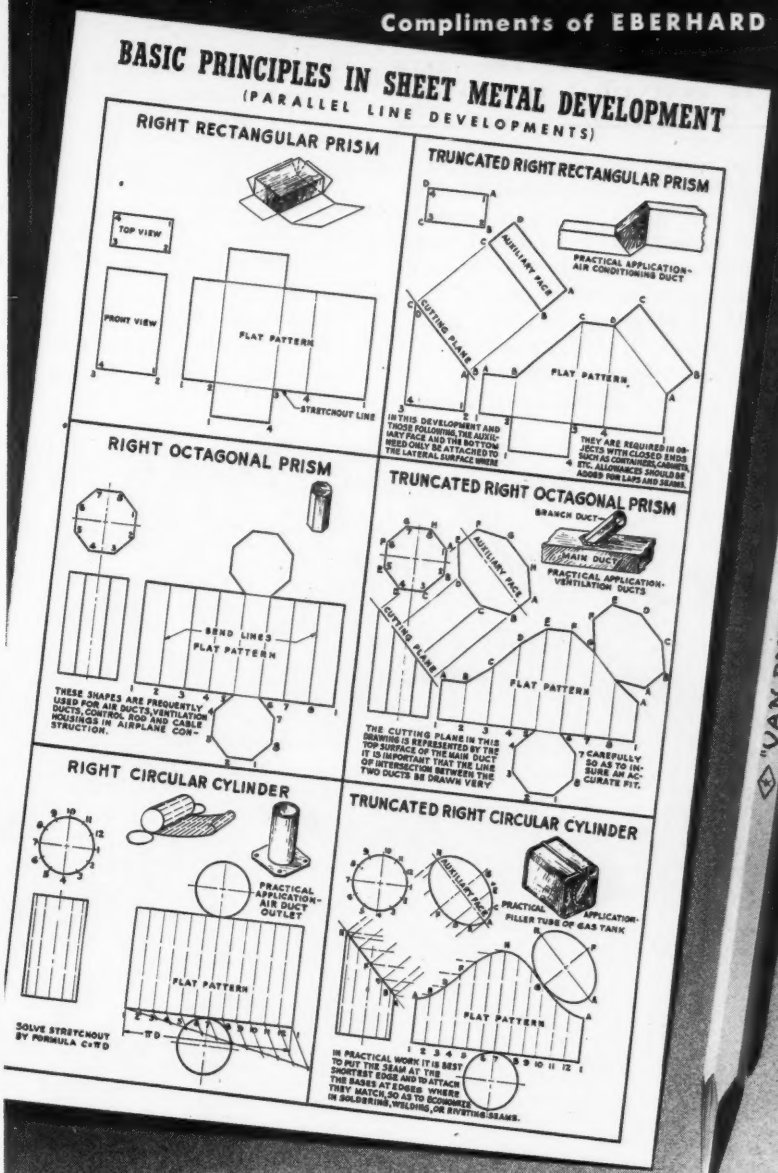
erty "by sale, exchange, lease, transfer, or other disposition." No material is to be disposed of so as to glut the market or close down factories manufacturing equipment.

Although the schools are not mentioned by name as the bill now reads, Washington observers believe that some used equipment might be shared with the schools under the terms of the George Bill, without endangering the regular manufacturing and distributing agencies now serving the schools.

● Departure of John J. Seidel from his desk as U. S. Deputy Commissioner for Vocational Education is regretted in Washington. He had brought to the federal office much needed imagination and zest in thinking and doing. He understood the importance of keeping shop teachers and vocational educators informed of activities and plans affecting their work and willingly shared such information. This is another way of saying that he had a good sense of public relations: an important requisite for any public official. Mr. Seidel returns to his duties as Assistant State Superintendent of Schools in Maryland. Jerry R. Hawke, for seven years a staff member of the U. S. Office of Education, Trade and Industry division, has been appointed in Mr. Seidel's place.

SEND FOR THIS SPECIAL CHART

Compliments of EBERHARD FABER


BASIC PRINCIPLES IN SHEET METAL DEVELOPMENT
(PARALLEL LINE DEVELOPMENTS)
RIGHT RECTANGULAR PRISM
TOP VIEW
FRONT VIEW
FLAT PATTERN
STRETCHOUT LINE
TRUNCATED RIGHT RECTANGULAR PRISM
AUXILIARY FACE
CUTTING PLANE
PRACTICAL APPLICATION-AIR CONDITIONING DUCT
FLAT PATTERN
RIGHT OCTAGONAL PRISM
BEND LINES
FLAT PATTERN
THESE SHAPES ARE FREQUENTLY USED FOR AIR DUCTS, VENTILATION DUCTS, CONTROL ROD AND CABLE HOUSINGS IN AIRPLANE CONSTRUCTION.
TRUNCATED RIGHT OCTAGONAL PRISM
BRANCH DUCT
MAIN DUCT
AUXILIARY FACE
CUTTING PLANE
PRACTICAL APPLICATION-VENTILATION DUCTS
FLAT PATTERN
RIGHT CIRCULAR CYLINDER
PRACTICAL APPLICATION-AIR DUCT OUTLET
FLAT PATTERN
SOLVE STRETCHOUT BY FORMULA C=πD
TRUNCATED RIGHT CIRCULAR CYLINDER
AUXILIARY FACE
PRACTICAL APPLICATION-FILLER TUBE OF GAS TANK
FLAT PATTERN
IN PRACTICAL WORK IT IS BEST TO PUT THE SEAM AT THE SHORTEST EDGE AND TO ATTACH THE BASES AT EDGES WHERE THEY MATCH, SO AS TO ECONOMIZE IN SOLDERING, WELDING, OR RIVETING SEAMS.
"VAN DYKE" EBERHARD FABER U.S.A. — 2H

Special Stimulation

To help stimulate and promote interest in one of today's most sought after subjects Eberhard Faber offers to teachers of Mechanical Drawing a large size wall chart on the BASIC PRINCIPLES IN SHEET METAL DEVELOPMENT. This chart illustrates studies in parallel line developments, as they apply to aircraft design, layout, lofting and fabrication. . . . MICROTOMIC VAN DYKE Drawing Pencils, famous in professional circles, will help the student achieve his highest skill.

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news

WHAT'S DOING IN THE FIELD OF INDUSTRIAL EDUCATION

THIS spring and summer will see a considerable number of conventions being held in the industrial education and allied fields. Organizations, dates, places, and officials are listed herewith:

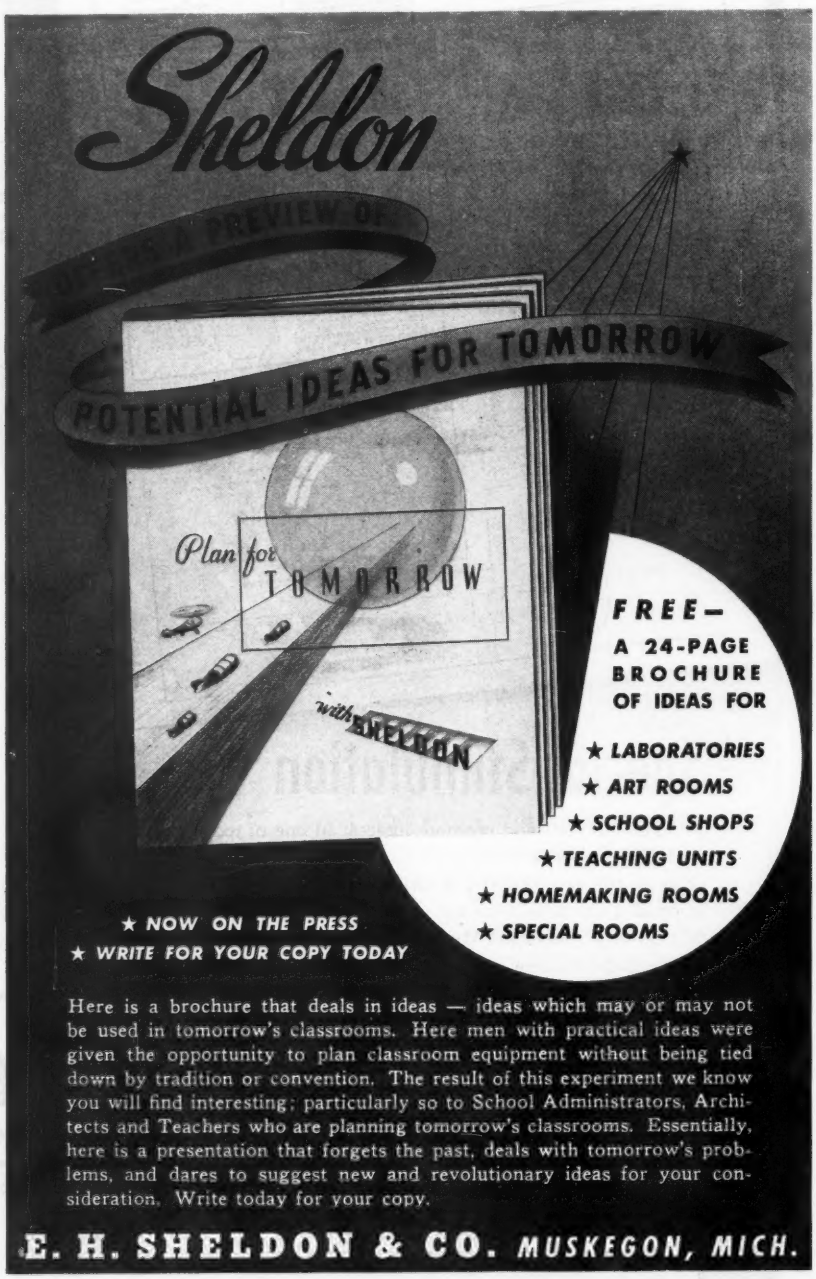
Illinois Vocational Association, April 13-15, Hotel Abraham Lincoln, Springfield, Ill. J. E. Hills, President.

Indiana Industrial Education Association, April 28-29, Hotel Claypool, Indianapolis, Ind. Dennis H. Price, President.

Wisconsin Association for Vocational and Adult Education, May 5-6, Hotel Schroeder, Milwaukee. John F. Jones, President.

Michigan Vocational Association in conjunction with the Michigan Industrial Education Society, May 11-13, Hotel Pantlind, Grand Rapids. Andrew Althouse, President.

Pennsylvania Vocational Association, June 29-30, Forest Inn, Eagles Mere, Pennsylvania. Ernest O. Kohl, Jr., President.



Here is a brochure that deals in ideas — ideas which may or may not be used in tomorrow's classrooms. Here men with practical ideas were given the opportunity to plan classroom equipment without being tied down by tradition or convention. The result of this experiment we know you will find interesting; particularly so to School Administrators, Architects and Teachers who are planning tomorrow's classrooms. Essentially, here is a presentation that forgets the past, deals with tomorrow's problems, and dares to suggest new and revolutionary ideas for your consideration. Write today for your copy.

E. H. SHELDON & CO. *MUSKEGON, MICH.*

AUTHORITATIVE answers to questions about Selective Service, the Army, the Air Forces, the Navy, Coast Guard, Marine Corps, and Merchant Marine are given in *Service in the Armed Forces*, a new pamphlet just issued by the U. S. Office of Education. In addition to the questions and answers, 60 illustrations, several pages of books for reference on each branch of the service, and an index of subject matter are included. The text was prepared by Franklin R. Zeran, specialist, Division of Occupational Information and Guidance, assisted by experts in all armed forces branches and the merchant marine. The pamphlet is No. 6 in the Victory Corps series and copies may be purchased from the Superintendent of Documents, Washington 25, D.C., for 20 cents.

STUDENTS in the various state trade schools in Connecticut have organized a state-wide group of student council representatives. The new student organization held its first meeting recently at the Boardman Trade School in New Haven with 60 delegates and faculty advisers present. The group provides a means for students and teachers to meet, exchange ideas, and be informed on the student activities of other trade schools in the state. At the first meeting, the delegates were escorted through the host school, reports on the activities of the various student councils represented were given, a tour was made of Yale University, the mayor of New Haven spoke to the group, and plans for a permanent organization were laid.

A PLAN has already been formulated by various community agencies and industries in Peoria, Illinois, for meeting the problem of returning the individual handicapped through military service, accident, or illness to a life as nearly normal as possible. Known as "The Peoria Plan for Human Rehabilitation," the program is based on the proposition that early preparation must be made by a community for returning disabled war veterans to employment. The support of most community groups—business, labor, church, school, veterans, and others—has been enlisted. Job surveys have been made; counseling services provided; case analyses made; work of federal, state, and local agencies correlated; and provisions made for vocational training. Chairman of the last-named division is Dean A. F. Siepert of Bradley Polytechnic Institute, Peoria, unlike most other communities in the United States, is prepared to help the handicapped make as rapid an adjustment as possible when they return home.

Strictly Personal...

ABOUT YOUR FELLOW TEACHERS

JERRY R. HAWKE, assistant director of the VTWPW program in the Trade and Industrial Education Division of the U. S. Office of Education, has been appointed Deputy Assistant U. S. Commissioner for Vocational Education, U. S. Office of Education, under Dr. J. C. Wright, Assistant U. S. Commissioner for Vocational Education. JOHN J. SEIDEL of Baltimore, Md., whom Mr. Hawke succeeds, has returned recently to his duties as assistant state superintendent of schools in Maryland. . . . New American Vocational Association officers elected at the Chicago convention include JOHN A. MCCARTHY, Assistant Commissioner of Education and State Director for Vocational Education in New Jersey, president of the Association; CHARLES W. SYLVESTER, Director for Vocational Education in Baltimore, Md., treasurer for another year; GEORGE H. FERN, State Director for Vocational Education in Michigan, vice-president for a term of three years representing the industrial education field; and CLAUD M. ANDREWS, Florida State Supervisor of Vocational Rehabilitation, vice-president for three years representing vocational rehabilitation. . . . EUGENE CLEHOUSE, machine-shop inspector in the Richmond, Indiana, High School, has been inducted into the armed forces and is now stationed at Ft. Belvoir, Va. . . . J. H. LISLE, head of the Behr-Manning Corporation's Educational Department, was killed while serving in the armed forces, H. G. SEAMAN replaces him on the Behr-Manning staff. . . . HOMER C. ROSE has been discharged from the Army to accept a commission as lieutenant (j.g.) in the Navy and is now stationed at Princeton University.

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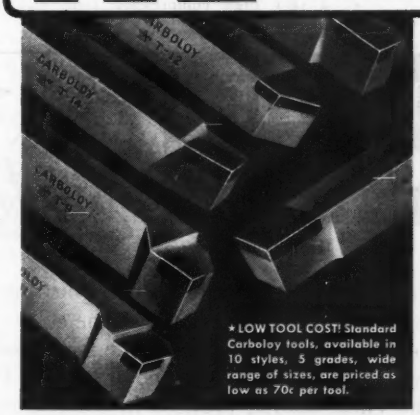

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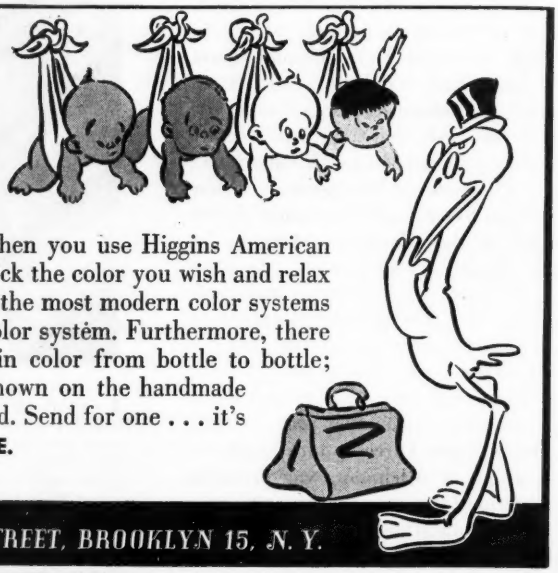

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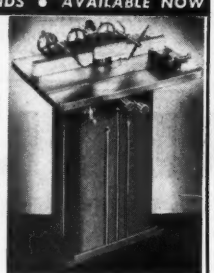

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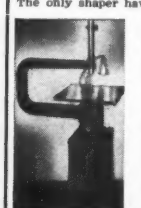

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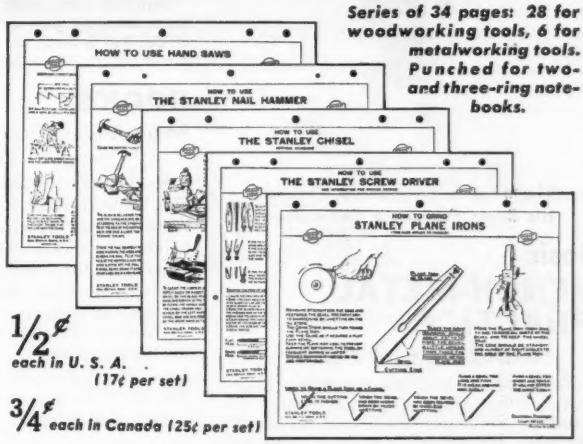

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BOOKS:

Basic Radio. Boltz. New York: Ronald Press Co., 1944. Pp. 272. $2.25.

Written by a Britisher expressly for beginning students, *Basic Radio* starts with the concepts that the general reader possesses and builds them into a thoroughly scientific understanding of the subject. From a discussion of fundamental ideas and definitions the book proceeds to sources of e.m.f. and Ohm's law, electromagnetic induction, condensers, alternating current, uses of inductance and capacitance, etc. Tubes and their uses are discussed. Receivers, aerials, and feeders are also presented. Appendix.

Diesel Locomotives—Electrical Equipment. Draney. Chicago: American Technical Society, 1944. Pp. iv + 388. $3.75.

Companionbook to *Diesel Locomotives—Mechanical Equipment*, this clearly written, easy-to-understand book is excellent reading for anyone interested in the subject, though it was designed specifically to aid in the preparation of men to operate and maintain Diesel locomotives. Chapters on current electricity, principles of a generator, transmission equipment, electromotive equipment, etc., are included. Well illustrated and indexed.

Author John Draney was assisted by engineers from Westinghouse Electric Company, General Electric Company, General Motors, Baldwin Locomotive Works, and the American Locomotive Company.

Fundamentals of Engineering Drawing. Luzadder. New York: Prentice-Hall, Inc., 1943. Pp. xiii + 568. $3.00.

This book has been designed to be as nearly selfteaching as possible with simple explanations of all the more common difficulties. It is planned so that the teacher may devote his energies to the general good of his students instead of taking all his time to explain small matters which could be taken care of just as well by the text. Thus, though the book is intended for college and technical schools it would make an excellent reference book for high-school mechanical drawing as well.

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Warren J. Luzadder is assistant professor of engineering drawing at Purdue University.

Power and Flight. Jordanoff. New York: Harper & Brothers, 1943. Pp. 314. $3.50.

A book on modern airplane engines, this companionpiece to *The Man Behind the Flight* discusses internal combustion engines, Diesels, and steam- and turbine-driven engines—how they work and how they must be maintained. Chapters on fuels and fuel systems, carburetion, ignition systems, lubrication, controls and instruments, and electric power. Engine overhaul is discussed thoroughly with chapters devoted to disassembly, cleaning, inspection, subassembly, and final assembly and test. More than 400 line drawings and photographs; indexed.

Assen Jordanoff, member of the Institute of Aeronautical Sciences and of the Society of Automotive Engineers, is author of several other books on aviation.

Radio Materiel Guide. Almstead, Tuthill. New York: McGraw-Hill Book Co., 1943. Pp. xi + 242. $2.00.

Standard fundamentals required of a radio operator, or of a person who wants background for studying the technical aspect of radio materiel, are presented in this book in such a manner that the information can be readily understood by those who have not had previous technical experience. The book can be used in preinduction classes, by Army and Navy communication officers, or for training radio and signal-corps men. Subject matter can be covered in a 16-week course, or the book can be used as a quick reference by men in action. The material given has been tested by the authors in actual classroom conditions.

Lt. Francis E. Almstead and Cmdr. F. R. L. Tuthill are both of the U.S. Naval Reserve.

Exploring the Industries. Groneman and Williams. Austin, Texas: The Steck Company, 1943. Pp. 160. 70c.

This worktext for general shop and laboratory of industries contains sections on drawing and planning, woods, benchmetal, forging, sheetmetal, art metal, and electricity. Each section has an introduction, followed by background material and problems and questions. There are many line drawings and illustrations for clear presentation of the various subjects. A set of progress charts, one for each section, designed for teacher use in grading the students is included.

Chris H. Groneman is professor of industrial education and E. L. Williams is professor and head of the department of industrial education in the School of Engineering, Agricultural and Mechanical College of Texas.

Elementary Rivet Theory. Blommel, Wheatley, Johnson. New York: D. Van Nostrand Co., Inc., 1943. Pp. v + 57. $1.00.

A beginner's manual which presents an elementary and easily understandable course in riveting, yet covers the field with thoroughness for both practical and theoretical training. Sections on safety, layout procedure, drilling, rivet computations, methods of riveting, special forms of riveting, inspection, and repairs.

William R. Blommel and Lt. Benjamin W. Wheatley, A.C., are both former heads, and Edwin L. Johnson is the present head of the department of rivet theory at the Ford Motor Company Airplane School, Willow Run, Mich.

(Continued on page 28)

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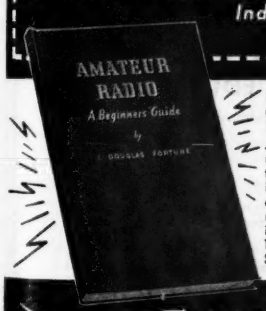

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Mechanic's Handbook. Scranton: International Textbook Company, 1943. Pp. 382. $1.00.

This new publication (replacing the *Machine Shop Handbook)* contains many useful tables and rules needed by the mechanic. New chapters on mechanics, strength of materials, plastics, welding, and first aid are included as well as material on drilling, threading, lathe work, die casting, gages, micrometers, brazing, etc.

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Drawing Instruction Booklets. *Techniques* is a 37-page booklet with 100 illustrations showing various ink drawing technics, 50c. *Script and Manuscript* illustrates 32 distinctive script alphabets, 50c. *Arts and Crafts* illustrates 10 projects on map and chart making, book binding, paper decorating, etc., $1.00. *Cartooning* gives technics used by America's top-flight cartoonists, with a chapter on the theory of humor, $1.00. All four books are published by the Higgins Ink Co., 271 Ninth St., Brooklyn 15, N. Y.

Crafts for Convalescents is a 44-page booklet prepared by the Industrial Arts Department of the Chicago Public Schools. Instructions in papercraft, woodcraft, bead and leatherwork, weaving, ceramics, plastics, metalcraft, and model building are included. Copies of the booklet may be obtained from the Gray Ladies Corps, Chicago Chapter American Red Cross, 529 South Wabash Ave., Chicago 5, Ill.

VISUAL AIDS:

Bibliography covering the subject of the use of motion pictures in education during the past 20 years has just been completed by Charles R. Crakes, Visual Educational Consultant for the DeVry Corporation, 1111 Armitage Ave., Chicago 14, Ill. Available to educators without cost. Please mention SCHOOL SHOP.

Lessons in Grinding are contained in a series of four 16mm motion picture sound and color films, produced especially for job-training programs. Titles are *Cutter Sharpening, The Cylindrical Grinder, The Surface Grinder,* and *The Grinding Wheel and Its Care and Use.* Loaned free of charge on two weeks' notice in advance of showing date. Write the Norton Company, Publicity Dept., Worcester, Mass., mention SCHOOL SHOP.

Electronics at Work, 16mm sound film, explains the six basic functions of electronic tubes and shows how each type of tube is used in some of the latest industrial and military applications. Twenty minutes long. Loaned free. Write Dept. 7-N, Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa., mentioning SCHOOL SHOP.

Sending Radio Messages is a 16 or 35mm sound film on radio principles of transmission with explanation of radio- and audio-frequency currents and their action in the modulating tube. Write Encyclopedia Britannica Films, Inc. (formerly Erpi Classroom Films, Inc.), 1841 Broadway, New York 23, N. Y., mentioning SCHOOL SHOP.

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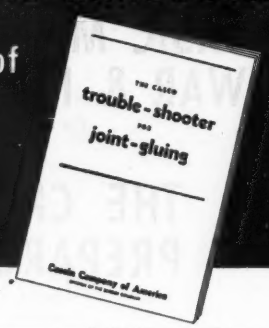

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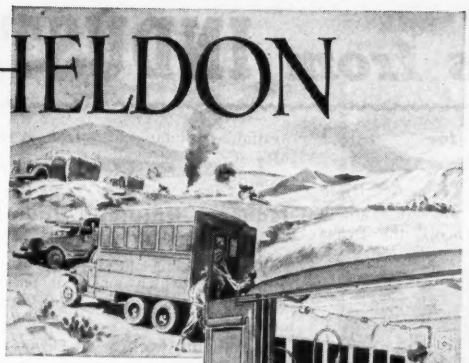

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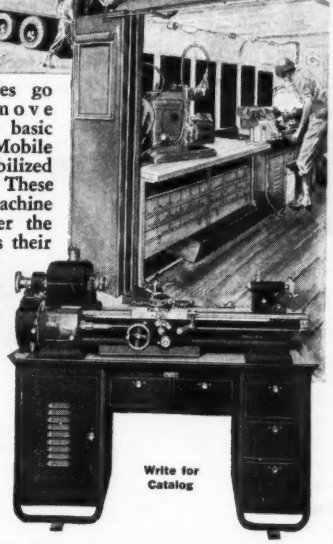

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. . . news from INDUSTRY

Film-Slide Projectors for War Training Schools

A limited number of new "Filmatic" triple-purpose slide-film projectors are now available for use in war training schools, the DeVry

Corporation of Chicago announces. Designed for use with single- or double-frame 35mm slide films and 35mm 2"x2" black-and-white or kodachrome slides, the projector has a feed capacity of up to 300 single-frame pictures, a cooling system to protect the lenses and film against heat damage, and a device which eliminates the necessity for rewinding. Write the DeVry Corporation, 1111 Armitage Ave., Chicago 14, Ill., *or check number 67 below.*

A-PE-CO Presents New Photo-Copy Machine

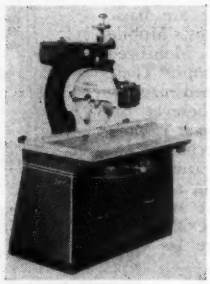
An inexpensive and easily operated Photocopyer is now available from the American Photocopy Equipment Company for use in school shops and classrooms. The machine, weighing less than 10 pounds, can copy anything: heavy cards, material printed on both sides, pages in books or magazines without removing them, or blueprints directly with no need for tracings. Copies can be made up to 18"x22" in three minutes for a single copy or 120 copies in an hour. For full details write the American Photocopy Equipment Company, 2849 North Clark St., Chicago, Ill., *or check number 68 below.*

Booklet on Use & Care of Portable Electric Drills

A handbook on the use and care of electric drills is offered by Black & Decker Mfg. Co., maker of portable electric tools. Illustrated with photos and drawings, the book should be of assistance in keeping school shop drilling equipment operating efficiently. Copies are available without charge from Black & Decker Mfg. Co., Dept. SS, Towson, Md., *or check number 69 below.*

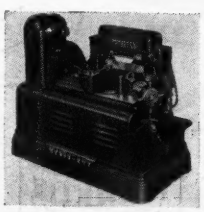
Monarch Uni-Point Radial Saw

American Saw Mill Machinery Company announces a new "uni-point" saw, operating on a principle which makes it possible for the operator to make an instant setting for any crosscut angle, with the saw blade always cutting into the work at the same point in the table. Thus the operator can set the machine for any cut without raising or lowering the saw or making any other complicated adjustments.



Among the safety features incorporated into the machine are the placing of adjustment and locking levers at the front of the machine, the adjustable guard with an anti-kick-back device, and the telescoping ram which returns the saw behind the fence leaving the table free of all obstructions. For further details write the American Saw Mill Machinery Company, Hackettstown, N. J., *or check number 70 below.*

Peerless Announces Improved Metal Cutting Power Saw



Special features of the new metal cutting power saw just announced by Peerless Machine Co., are a new hydraulic unit by means of which feed pressure can be selected to the accuracy of ounces, a four-sided saw frame which completely surrounds the blade and the work, and a blade support which permits the application of maximum feed pressure with minimum strain on the blade. For complete information write the Peerless Machine Co., Racine, Wis., or *check number 71 below.*

Quality Control—A Handbook of Scientific Inspection

This 64-page booklet on gages and gage instruments contains much usable information on standards of measurements and how to attain them. Explanation is given of how precision measurement is done with light waves, with gage blocks, and with gage instruments. Trammel, center and scriber points, snap gages, parallels, and sine bars are described and illustrated. Tables and charts, index, glossary, and series of questions and answers. Write Continental Machines, Inc., 1301 Wash-

ington Ave., South, Minneapolis, Minn., *or check number 72 below.*

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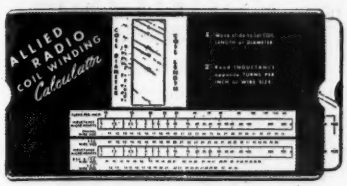

Allied Radio Corporation announces a new coil-winding and RF resonance calculator, permitting quick and accurate determination of inductance, capacitance, and frequency components of series- or parallel-tuned RF circuits, as well as inductance, turns per inch, wire type, wire size, coil diameter and coil length for single layer-wound solenoid type RF coils. All values are found with a single setting of the slide and are accurate to within approximately 1%. Priced at 25c each. Write Allied Radio Corporation, 833 West Jackson Blvd., Chicago 7, Ill., *or check number 73 below.*

New Literature . . .

Radiant screen and photographic accessories are listed in the new catalog of the Radiant Manufacturing Company. A new line of non-priority screens is described, as well as Radiant's regular metal screens which are available to schools offering proper priority. Write Radiant Mfg. Corp., 1140 West Superior St., Chicago, Ill., *or check number 74 below.*

Ohlen-Bishop Saws for carpenter and mechanic, for farm and industrial purposes, are described and full specifications given in their new 59-page catalog, No. 43. Write the Ohlen-Bishop Mfg. Co., Columbus, Ohio, *or check number 75 below.*

Blackhawk Wrench Catalog, No. 243, contains a "dictionary of popular wrench terms" and a section on the "proper selection of wrenches for extra speed, safety, and utility on the job." Lists complete basic range in socket, box-type and open-end wrenches, torque indicators, and wrench assortments. Write Blackhawk Mfg. Co., Milwaukee 1, Wis., *or check number 76 below.*

ENCO turret tool posts for Atlas, Logan, Sheldon, and South Bend lathes, available for immediate delivery, are described, along with tailstock turret posts, in 3 brochures. Write the ENCO Manufacturing Co., 3321-3323 Montrose Ave., Chicago 18, Ill., *or check number 77 below.*

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General Shop for Girls

BY *Percy H. Heron*

The four men who teach this orientation course for girls about to enter industry have all had practical experience in the aircraft building field. The course content is not only valuable for work orientation but has general educational values as well, especially for future homemakers. P. H. Heron is head of the Technical Department, San Diego, California, High School and has also operated the Heron Mfg. Co., builders of aircraft parts.

San Diego Schools Photo

Simple turning is part of the five-week course in machine shop.

SAN DIEGO HIGH SCHOOL is now preparing girls for direct entry into industry.

Fundamentals of Shop Work for Girls is a one-semester course open to senior girls who desire employment in war industry after graduation.

Each girl spends five weeks in each of the following four areas: electrical work, machine-shop practice, drafting, and sheetmetal work.

The drafting course teaches in five weeks, one hour a day, skill in reading mechanical, machine, and aircraft-part drawings. It includes, also, some instruction in making working drawings. The objective of the course is to provide a general guide to blueprint reading in fields now calling for trained help, and to teach girls how to interpret practical drawings.

The five-week electric shop course is planned to give each girl an understanding of:

1. The electrical equipment with which she is most likely to come in contact, and to show her how to repair many of the simple electrical devices which do not require a highly skilled technician;

2. The types of electrical work that women are now doing in the various aircraft plants so that she can determine whether or not she is interested in or suited for a given type of work; and

3. Safety rules and shop practices pertaining to electricity.

In a five-week period it is possible to touch on only the basic principles of electrical work which are included under the three main aims. The work consists of laboratory exercises with class discussion added where safety and shop practices are explained. The girls have actual experience in repairing electrical cords for all types of electrical devices, using electric soldering irons, splicing wires, replacing fuses, and tying wires together as is done in electrical wiring in aircraft work.

Since girls are entering a new environment when they go into a machine shop, they are instructed in only the barest fundamentals of machine-shop practice. By learning merely enough to feel confident of their ability in this new atmosphere, they gain much.

The work done in machine shop gives initial experiences in the following skills: measuring with a rule; doing a simple layout; filing; using wrenches, screwdrivers, and a hacksaw; drilling and reaming holes; cutting threads with a tap and die; turning on a lathe; and measuring with micrometer calipers. A comprehension of the precision necessary in acceptable products of machine tools is attained as they learn to read, and use, the steel rule and the micrometer calipers.

Specific safety rules about each machine, as well as general safety rules pertaining to conduct and dress, are impressed on the students.

In the sheetmetal shop, as well as in the machine shop, the instructor must take into consideration the fact that most of the students have not worked before and must, therefore, cultivate desirable habits and attitudes. Under this broad heading are included:

Respect—being mindful of authority and of the rights of others.

Cooperation—being able to work amiably with others.

Ambition—being interested in the task assigned.

Promptness—never being late with work, or to work.

Dependability—doing the job and doing it right.

Resourcefulness—being able to draw on experience and to be in command of a situation.

Economy—saving time and material.

Loyalty—being faithful and cheerful in service to supervisors and to our Country.

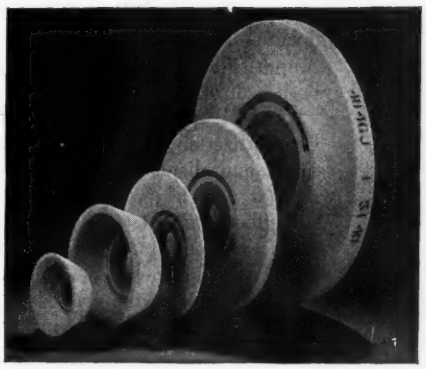
The importance of health and safety is emphasized. Shop directors do not tolerate the wearing of loose clothing, flying tresses, and jewelry; operating machines without guards; or doing any hazardous operation without eye shields or goggles.

The task of teaching the proper use of tools and machines might be classified under two headings; bench work and machine work. Bench work includes the care and use of such hand tools as: tin snips, ball-pein hammers, C-clamps, files, scales, screwdrivers, wrenches of all types, hacksaws, scratch awls, mallets, soft-face hammers, etc. Under machine tools we have the care and use of the drill press, squaring shears, electric hand drill, bar folder, brake, rivet gun, etc.

The five-week electric shop course is designed to give knowledge of electrical equipment, simple repairs, types of industrial work in the field, and safety rules and shop practices.

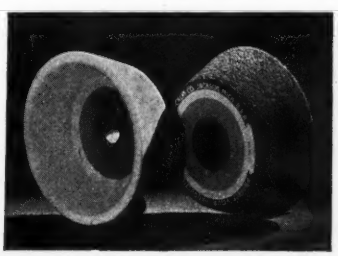
San Diego Schools Photo

MACKLIN GRINDING WHEELS



MACKLIN Grinding Wheels are made in all sizes and shapes, all grain and grade combinations for use on all kinds of grinding jobs. There are particular Macklin Wheels designed for special use in school shops that will give long life while grinding efficiently and economically.

Macklin Tool Room Wheels are extensively used throughout industry because they cut cool and fast, hold their shape and give long wheel life while grinding to extremely exacting limits.



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EDUCATIONAL DEPARTMENT, STANLEY ELECTRIC TOOL DIVISION

THE STANLEY WORKS, NEW BRITAIN, CONN.

from WASHINGTON by MICHAEL PACA

VOCATIONAL educators would do well to put the name of Brig. Gen. Frank T. Hines in their notebooks and underscore it heavily. Add after that name also two sets of initials: RRA and SWPA, standing for Retraining and Reemployment Administration and Surplus War Property Administration, respectively.

For Gen. Hines and these two agencies, over which he is a super-coordinator, will affect the course of vocational education for many months to come.

This new development had its origins in the Baruch Report in which that venerable statesman sketched in large sweeps of the brush the outlines of postwar demobilization. After the war, wrote Bernard Baruch, we must give attention to (1) the human side of demobilization and (2) the disposal of surplus government property accumulated during the war. Acting swiftly, President Roosevelt filled in some of the details of the postwar picture by issuing two executive orders setting up the RRA and SWPA, and naming Gen. Hines at their head.

● If Gen. Hines means and realizes what he has been saying officially in Washington since he was appointed, he is undertaking the most staggering human-engineering effort in the history of any people. His "brief" list of "some of the subjects" on which he will be working include, according to an official statement: jobs, vocational training, resumption of high-school and college education, consideration for disabled veterans, problems of workers who have migrated to crowded war centers, adjustment of labor laws to changing manpower needs, timing of release of workers from industry, and the rate and method of demobilizing the armed services. To top it all off, the General includes among his jobs "demobilizing plans of other countries."

The list of federal agencies, whose work he will seek to coordinate, is equally staggering: the Department of Labor, U. S. Office of Education, Vocational Training Programs, Social Security Board, U. S. Employment Service, Selective Service, Civil Service Commission—in short, nearly all of the bureaus and offices which touch on the lives and welfare of citizens.

● Talk around Washington lunch tables is that Gen. Hines is the "new McNutt"; that just as Mr. McNutt, through his War Manpower Commission, gave direction to the training and mobilizing effort for war, so will Gen. Hines direct the demobilization effort for peace.

● While he is handling the human side of demobilization with one hand, Gen. Hines' other hand will be busy disposing of surplus government property. This, too, is an area staggering the human imagination, including as it does 75 billion dollars' worth of planes, battleships, steel, rubber and aluminum plants, housing, machine tools—down to motion-picture projectors and welding rods.

School men have already expressed interest in the disposal of government surplus property, especially machine tools and other vocational-training equipment, as well as the rich store of visual educational films and projectors.

If one looks to the Baruch report for an inkling that some of this property might be made available to the schools, disappointment is in store. Mr. Baruch's emphasis is on *sell* instead of *give*. For example: "Sell as much and as early as possible," says the Baruch Report, "without unduly disrupting normal trade . . . get fair market prices for the values . . . sell as in a goldfish bowl, with records always open to public inspection . . . surpluses to be offered in lots of such size as to permit businesses of all sizes to participate. . . ."

● Meanwhile Congress is determined not to give the surplus-property show away to the Executive altogether. A dozen bills, seeking to regulate the disposal of surplus, are already pending. Of especial interest to public education is S. 1609, introduced by Senator Murray, with a companion bill by Rep. Starnes. This bill provides that machine tools shall be made available without charge to public schools "to promote training and instruction in the skills and sciences."

A Federal Machine Tool Commission would be set up to write the rules for transferring machine tools. Courses in which these machine tools could be used would have to be planned by a local board of five members—three supervisors from local plants, one vocational educator, and one member from the public at large.

But there are several stumbling blocks in the path of this bill: the Bureau of the Budget frowns on free transfers of war materials; "give-aways" are contrary to the intent of the Baruch Report; and, surprisingly, educators have exerted little pressure in support of the bill. Hence, the Murray-Starnes measure may fade from the legislative picture altogether.

Taking precedence over all bills relating to war materials will probably be Senator George's Bill, S. 1730. This influential Senator is marshalling strong support for his measure and he may push it through the Congress.

The bill provides for an Office of Demobilization, which would close contracts and dispose of materials, in a manner which "would preserve and strengthen the American system of free competitive enterprise, promote full employment, and prevent monopoly."

The director of the proposed office is authorized to dispose of surplus prop-

(Continued on page 21)

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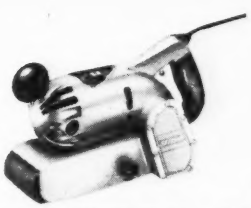

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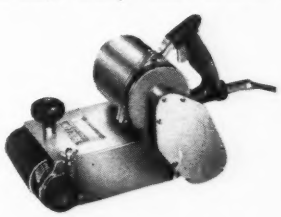

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